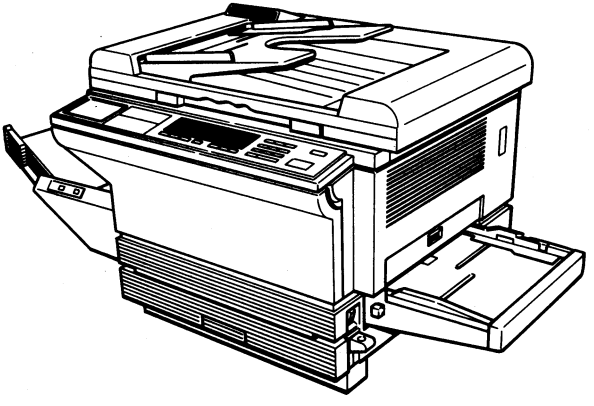
RICOH

FT2260

SERVICE MANUAL



RICOH COMPANY, LTD.

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VINYL ENVELOPE

POINT-TO-POINT

ELECTRICAL COMPONENT AND CONNECTOR LAYOUT - COPIER

ELECTRICAL COMPONENT AND CONNECTOR LAYOUT-DF

ELECTRICAL COMPONENT AND CONNECTOR LAYOUT-SORTER

TABLE OF ADJUSTMENTS

SERVICE TABLES

SECTION 1

OVERALL MACHINE INFORMATION

1. SPECIFICATIONS

Configuration:	**Desktop**
Copy Process:	**Mono-component dry toner process**
Originals:	**Book/sheet**
Maximum Original Size:	**A3, (11" x 17")**
Copy Paper Size:	**Maximum: A3, 11" x 17"** **Minimum: A6, 8½" x 5½"**
Copy Paper Weight:	**Cassette Feed: 52 to 105 g/m²** **14 to 28 lb** **Paper Tray Feed: 52 to 157 g/m²** **14 to 42 lb**
Maximum Original Weight:	**5 kg (11 lb)**
Reproduction Ratio:	**[115 V/60 Hz] [220, 220 V/50 Hz]** **1:1.55 1:1.41** **1:1.29 1:1.22** **1:1 1:1** **1:0.93 1:0.93** **1:0.74 1:0.82** **1:0.65 1:0.71**
Zoom:	**From 50% to 200% in 1% increments**
Copying Speed:	**15 copies per minute (A4, 8½" x 11" sideways)** **7.5 copies per minute (A3, 11" x 17")**
First Copy:	**8.5 seconds**
Reproduction Ratio Change:	**Less than 6 seconds**
Warm-up Time:	**Within 40 seconds (Room temperature 20 degrees Celsius)**
Operation Control:	**Microprocessor**
Copy Counter:	**1 to 99 copies (Count-up/down)**
Image Density:	**Exposure lamp intensity control (5 steps and auto image density)**

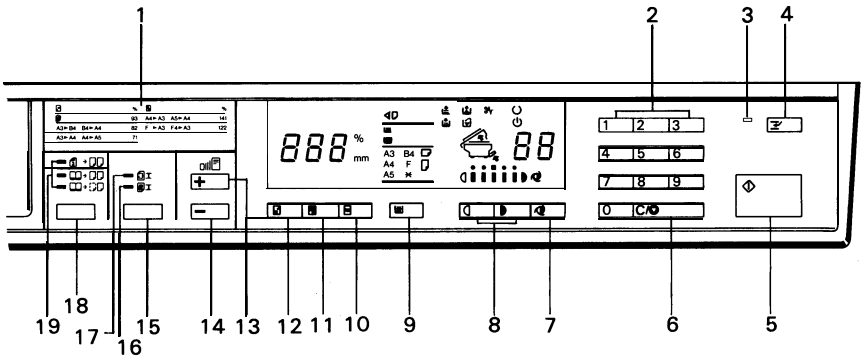
Automatic Reset:	**After 60 seconds** **- Copy Counter:** 1 **- Image Density:** **Auto ID** **– Book Mode:** **OFF** **– Reproduction Ratio:** **Full size** **– Interrupt Mode:** **OFF**
Photoconductor:	**Organic photoconductor (Master)**
Master Charge:	**Single-wire with grid plate (Negative Charge)**
Exposure System:	**Slit exposure, fixed platen**
Exposure Lamp:	**Halogen Lamp : 97V,300W(115V)** **180V, 300W (220/240V)**
Optics:	**Through type lens: F= 8, f= 180 mm**
Erase:	**LEDs**
Development:	**Mono-component dry toner system**
Toner Replenishment:	**Cartridge:** **- Black toner cartridge: 170g** **- Color toner cartridge: 100 g (red, green, blue)**
Toner Consumption: **(A4/8½" x 11" 6% Originals)**	**3,000 copies/cartridge - black toner** **2,600 copies/cartridge - color toner**
Development Bias:	**Negative fixed bias** **– 225 volts for black development** **-180 volts for color development**
Image Transfer:	**Single wire dc corotron (Negative charge)**
Cleaning:	**Cleaning blade**
Quenching:	**LEDs**
Paper Feeding:	**Cassette (250 sheet capacity) and Paper Tray (100 sheet capacity, 1 sheet for OHP transparencies)**
Paper Feed System:	**Cassette feed: Feed roller and friction pad system** **Paper tray feed: Pick-up roller, feed roller, and friction pad system**

Image Fusing:	**Heat and pressure type, teflon and silicone rubber rollers**
Fusing Lamp:	**Halogen lamp, 960 W**
Copy Tray Capacity:	100 **sheets**
Self-diagnostic Codes:	**21 codes, indicated in the magnification ratio display**
Power Source:	**115V/60Hz: 12A** **220V, 240V/50Hz: 6A** **220V/60Hz: 6A**
Power Consumption:	**Maximum: 1.4 kW** **Warm-up: 1.0 kW** **Stand-by: 110W** **Copy cycle: 560 W**
Dimensions (W x D x H):	**640 x 618x 389 mm,** **25.2 x 23.3x 15.3 inches**
Weight:	**Approximately 50 kg (110.2 lb)**
Optional Equipment:	**- Cassette (Universal)** **- Color Development Unit** **- Sorter** **- Document Feeder (requires power supply unit)**

2. OPERATION PANEL

2.1 KEYS AND LABELS

- A4/A3 VERSION -



1. Magnification Ratio Plate
Shows the standard reproduction ratios.

2. Number Keys
The number keys are used to enter the desired number of copies. They are also used to input the data for the size magnification mode.

3. Interrupt Indicator
Lights when interrupt mode is selected.

4. Interrupt Key
Press to make interrupt copies during a copy run.

5. Start Key
Press to start operation.

6. Clear/Stop Key
Press to cancel the copy number entered. While copying, press to stop copy operation.

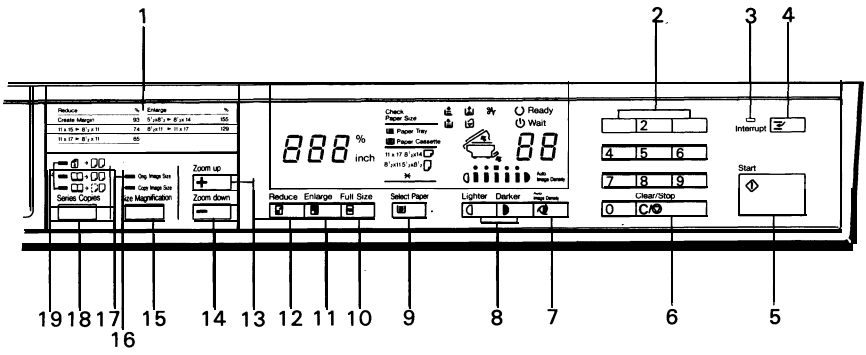
7. Auto Image Density Key
Press to select or cancel automatic image density mode.

8. Manual Image Density Keys
Press to make copies lighter or darker. Use these keys to cancel automatic control and manually select the image density level.

9. Select Paper Key
Press to select cassette or paper tray.

10. Full Size Key
Press to make the copy image the same size as that of the original.

- LT/LDG version -



11. Enlarge Key
Press to make enlarged copies.

12. Reduce Key
Press to make reduced copies.

13. Zoom Up Key
Press to increase the reproduction ratio in 1% steps.

14. Zoom Down Key
Press to decrease the reproduction ratio in 1% steps.

1$. Size Magnification Key
Press to select size magnification mode.

16. Copy Image Size Indicator
Lights to show when to enter the copy size when in size magnification mode.

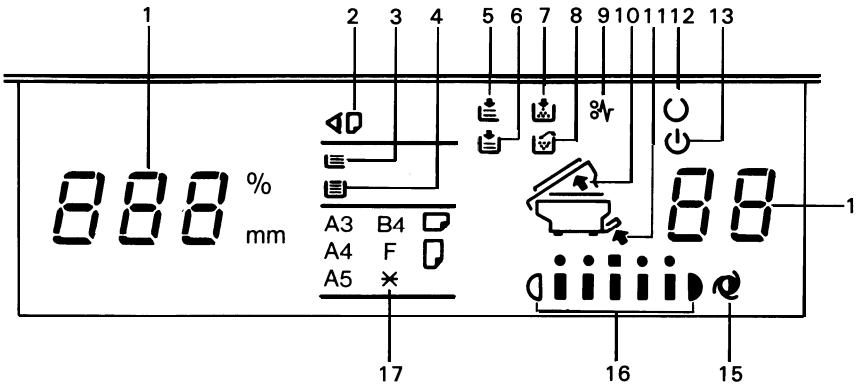
17. Original Image Size Indicator
Lights to show when to enter the original size when in size magnification mode.

18 Series Copies Key
Press to make series copies.

19. Series Copies Indicators
Shows which series copies mode is selected.

2.2 INDICATOR SCREEN

- A4/A3 version -



1. Magnification Ratio Indicator
Shows the selected reproduction ratio and the data for the size magnification mode.

2. Check Paper Size Indicator
Blinks when the paper size selected does not match the selected mode. (Copying is impossible.)

3. Paper Tray Feed Indicator
Shows the paper tray feed.

4. Cassette Feed Indicator
Shows the cassette feed.

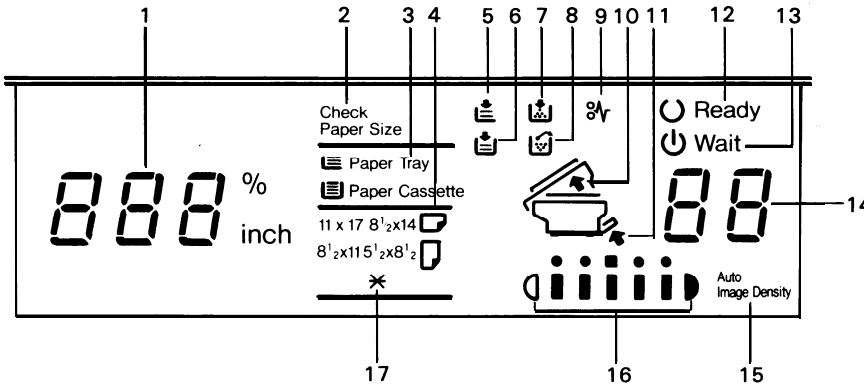
5. Check Paper Tray Indicator
Lights when either no paper is in the paper tray or there is a paper misfeed at the paper tray.

6. Load Paper Indicator
Lights when either no paper is in the cassette or the cassette is not properly positioned.

7. Add Toner Indicator
Lights when the development unit is not installed or it is time to change the toner cartridge.

8. Replace Toner Collection Unit Indicator
Lights when it is time to change the toner collection unit.

- LT/LDG version -



9. Check Paper Path Indicator
Lights when there is a paper misfeed within the copier.

10. Lift Top Unit Indicator
Lights to show when to lift the top unit when misfed occurs within the copier.

11. **Lift Paper Tray Indicator**
Lights to show when to lift the paper tray when misfed occurs within the copier.

12. Ready Indicator
Lights when the machine is ready to make copies.

13. **Wait Indicator**
Indicates that the machine is not ready to copy.

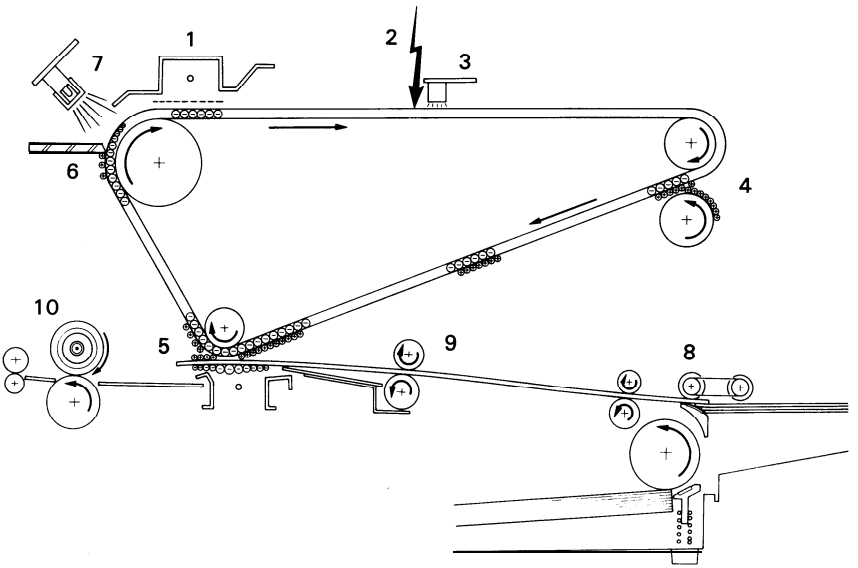
14. Copy Counter
Shows the number of copies entered. While copying, this counter shows the number of copies made. (Count up type)

15. **Auto Image Density Indicator**
Lights when the copier is automatically controlling the image density.

16. Manual Image Density Indicators
Show the manually selected image density.

17. **Paper Size Indicator**
Shows the size and direction of paper in the cassette or the paper tray.

3. COPY PROCESS



1. Charge

In the dark the charge corona unit applies a negative charge to the master. The grid plate ensures the charge is applied uniformly. The charge remains on the surface of the master because the photoconductive master has a high electrical resistance in the dark.

2. Exposure

High intensity light is reflected from the original to mirrors and through the lens to the surface of the master. The charge on the photoconductor surface is dissipated in direct proportion to the intensity of the exposure light, thus producing an electric latent image on the master surface.

3. Erase

The erase lamp illuminates the areas of the charged master surface that will not be used for the copy image. The resistance of the master in the illuminated areas drops and the charge on those areas dissipates.

4. Development

A thin layer of positively charged toner on the development roller comes in contact with the latent image on the master surface. Toner particles are electrostatically attracted to the negatively charged areas of the master surface.

5. image Transfer

Copy paper is fed to the master surface while a strong negative charge is applied to the back side of the paper. The negative charge pulls the toner particles from the master surface onto the paper. The paper then separates from the master and moves to the fusing unit.

6. Cleaning

In preparation for the next copy, the cleaning blade removes any toner remaining on the master surface.

7. Quenching

The light from the quenching lamp electrically neutralizes the surface of the master.

8. Paper Feed

Paper can be fed either from the cassette or from the paper tray. The relay rollers carry the paper to the registration rollers.

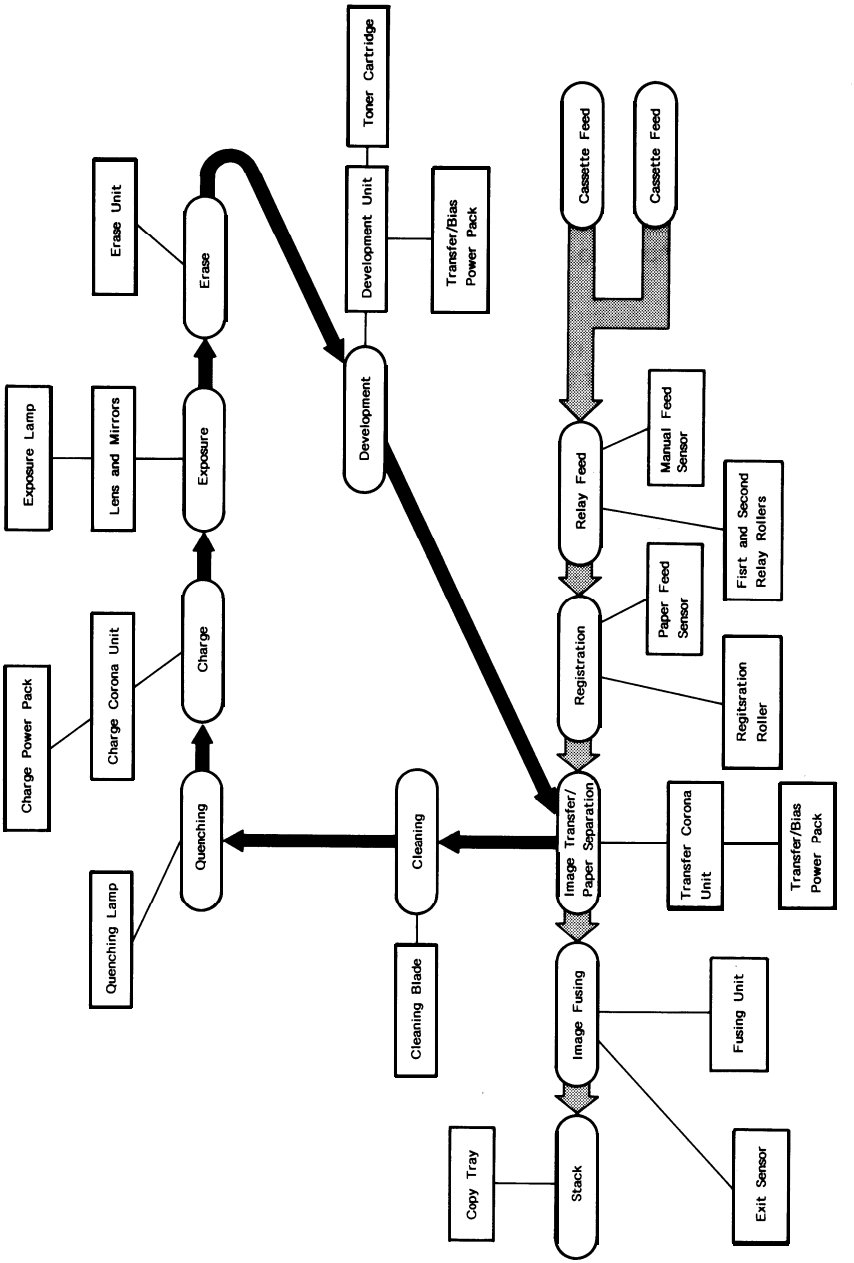
9. Registration

The registration rollers stop the paper to correct skew and control the registration timing.

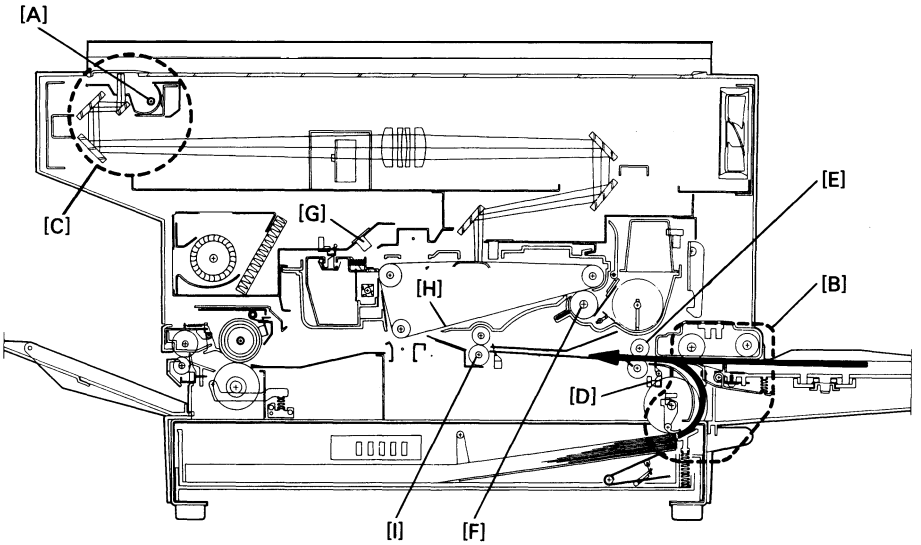
10. Fusing

The image is fused to the copy paper by two rollers which apply heat and pressure.

4. FUNCTIONAL OPERATION



5. COPY CYCLE

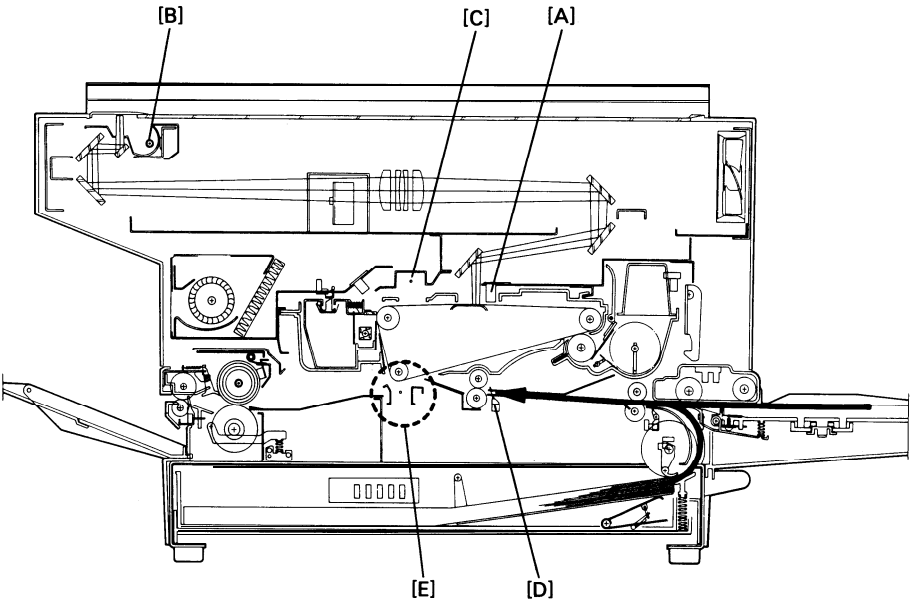


NOTE: **This section describes a single A4/letter copy cycle. The details of timing events for multiple copy cycles or different paper sizes may vary. See the timing charts for details.**

The copy cycle has two phases. The first phase begins when the Start key is pressed. At that time the Ready indicator turns off and the Wait indicator turns on. At the same time the master solenoid, exposure lamp [A], feed solenoid (either tray or cassette), and total counter all turn on. The paper feed mechanism [B] separates one sheet of paper from the paper stack at this time. Just after the Start key is pressed (0.1 second delay), the main motor and scanner motor turn on. The scanner [C] moves 100 mm away from the left scale and then reverses. While it is returning to the home position, the original image density is scanned.

About 93 timing pulses (1 pulse = 11.38 ms) after the Start key is pressed, the paper actuates the feed sensor [D]. The feed solenoid turns off 22 pulses later. The relay rollers [E] then continue feeding the paper.

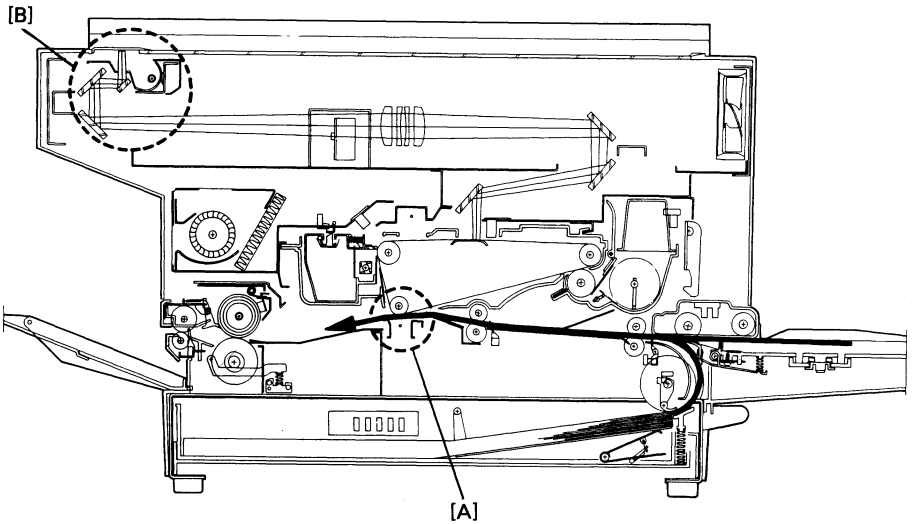
At about the same time that the feed solenoid turns off, the scanner reaches the home position. The scanner motor and exposure lamp then turn off. At the same time, the development bias turns on to apply a high voltage to the development roller [F]. Also, the quenching lamp [G] turns on, and the master solenoid turns off (to start the master belt [H] turning). At this time the leading edge of the copy paper is between the relay rollers and the registration rollers [I].



The second phase of the copy cycle begins the next time the master sensor detects the sensor plate on the master belt. At this time, the LEDs of the erase lamp unit [A] all turn on for leading edge erase, and the pulse count is reset to 0. The exposure lamp [B] turns on 1 pulse later, and the charge corona [C] turns on an additional 8 pulses after that. The scanner drive motor turns on soon after the charge corona turns on; the exact timing depends on the reproduction ratio.

Just after the leading edge of the latent image on the master passes the erase lamp unit the erase lamp switches from leading edge erase to side erase.

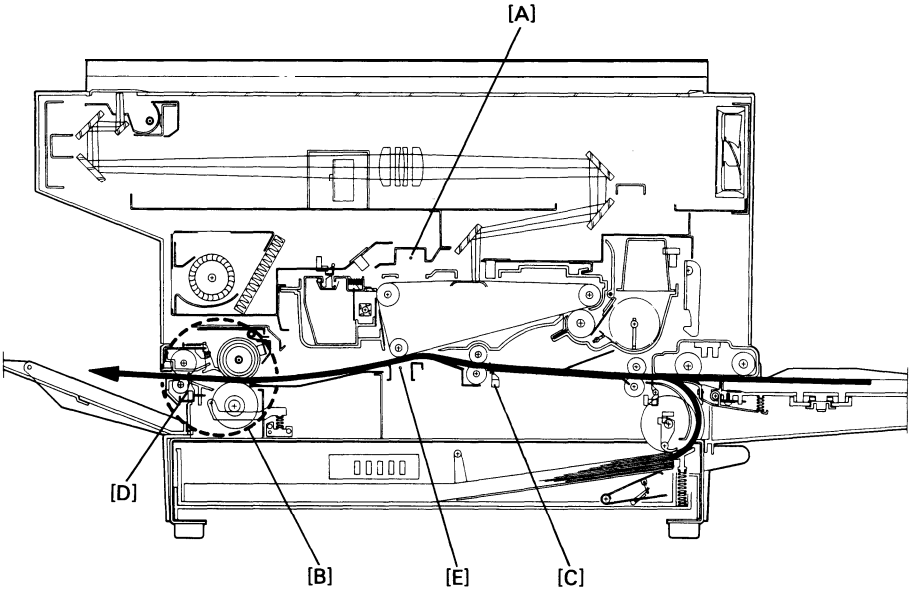
Next, the leading edge of the paper actuates the registration sensor [D]. Nine pulses after that, the relay feed solenoid turns on, disengaging the relay roller spring clutch. The paper waits at this point until the proper time for it to be fed to the image transfer area [E] (registration timing). Just before registration start timing, the erase lamp unit switches from side erase to trail edge erase.



About 182 pulses after the leading edge of the latent image passes the erase lamp position (exact timing depends on DIP switch setting), the registration solenoid turns on and the relay feed solenoid turns off. Paper then starts feeding to the image transfer section [A]. At the same time, the scanner motor reverses to return the scanner to the home position and the exposure lamp turns off.

Just before the paper reaches the transfer position (at the 287th pulse), the transfer corona turns on. At about the same time, the trailing edge of the paper passes the feed sensor and the scanner reaches to the home position [B].

As the paper passes between the transfer corona and the master belt, the positive toner image on the drum is pulled from the drum onto the passing paper by the negative transfer corona.

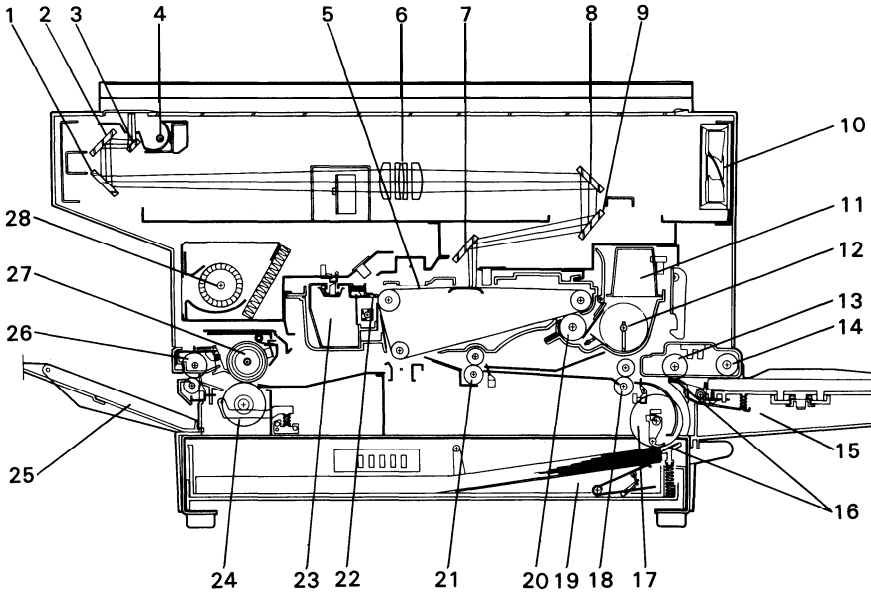


At the 355th pulse the charge corona [A] turns off. About this time the paper enters the fusing unit [B]. Slightly after that at about the 401st pulse, the trailing edge of the paper passes the registration sensor [C]. The registration solenoid turns off 17 pulses later. Soon after that (about 30 pulses) the leading edge of the paper actuates the exit sensor [D].

Next the transfer corona [E] turns off (at the 469th pulse) and after that the paper exits the the copier. The Ready indicator turns on when the paper starts exiting the copier.

Shortly after the paper exits the copier, the main motor, quenching lamp, erase lamp, and development bias all turn off. The master solenoid turns on at the same time to stop the master belt. The master solenoid stays on for 2.3 seconds after the copy cycle has finished.

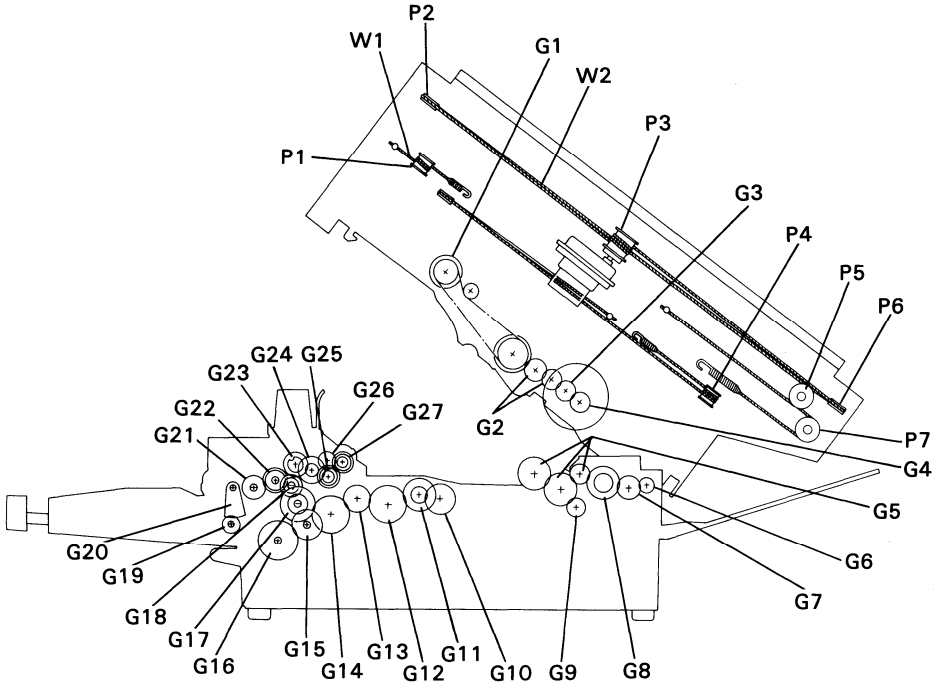
6. MECHANICAL COMPONENT LAYOUT



Front View

1. Third Mirror
2. Second Mirror
3. First Mirror
4. Exposure Lamp
5. Master belt
6. Lens
7. Sixth Mirror
8. Fourth Mirror
9. Fifth Mirror
10. inlet Cooling Fan
11. Toner Cartridge
12. Toner Mixing Bar
13. Tray Feed Roller
14. Pick-up Roller
15. Paper Tray
16. Friction Pads
17. Cassette Feed Roller
18. Relay Rollers
19. Paper Cassette
20. Development Roller
21. Registration Rollers
22. Cleaning Blade
23. Used Toner Tank
24. Pressure Roller
25. Copy Tray
26. Exit Rollers
27. Hot Roller
28. Exhaust Blower

7. DRIVE LAYOUT



Gears:

G1: Master/Developtnent Drive Gear
G2: Drive Relay Gears
G3: Main Motor Gear
G4: Fusing Drive Gear
G5: Idle Gears
G6: Exit Roller Gear
G7: Idle Gear
G8: Hot Roller Gear
G9: Fusing Knob Idle Gear
G1O: Engage Gear
G11: Registration Roller Gear
G12: Idle Gear
G13: Idle Gear
G14: Idle Gear
G15: Idle Gear
G16: Cassette Feed Roller Gear
G17: Relay Roller Drive Gear
G18: Idle Gear
G19: Pick-up Roller Cam Gear
G20: Sector Gear
G21: Tray Feed Roller Gear
G22: Idle Gear
G23: Toner Agitator Gear
G24: Idle Gear
G25: Toner Supply Gear
G26: Idle Gear
(327: Development Roller Gear

Pulleys:

P1: Mirror Drive Pulley
P2: Idle Pulley
P3: Scanner Drive Pulley
P4: Lens Drive Pulley
P5: Second Scanner Pulley
P6: Idle Pulley
P7: Idle Pulley
P8: idle Pulley

Belt:

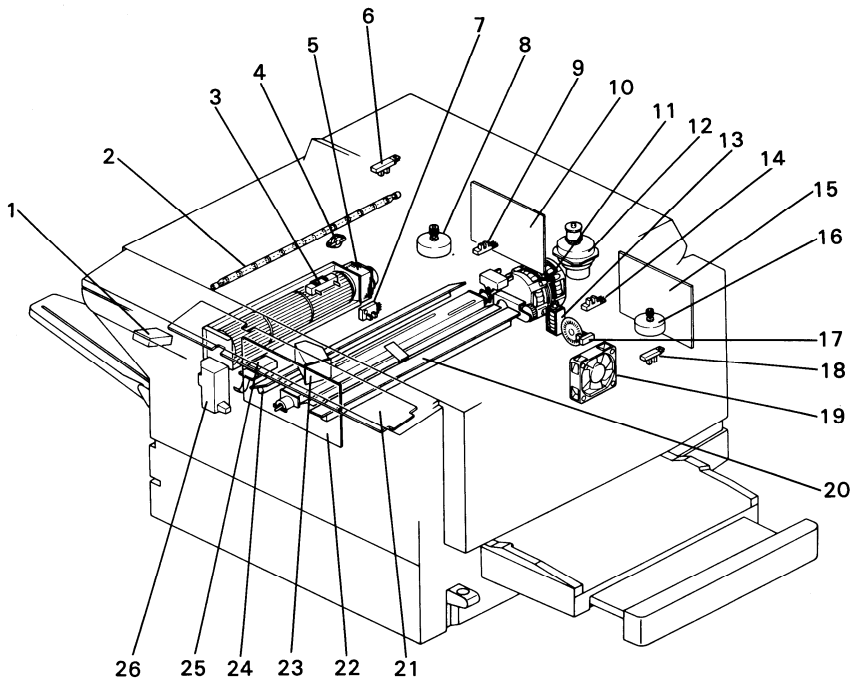
91: Timing Belt

Wires:

W1: Mirror Drive Wire
W2: Scanner Drive Wire
W3 Lens Drive Wire

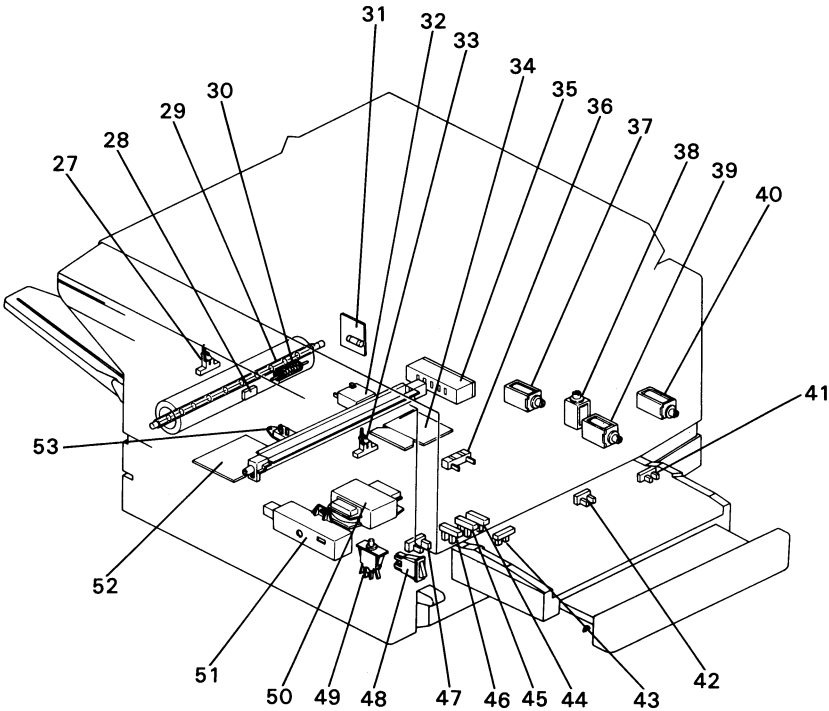
8. ELECTRICAL COMPONENT LAYOUT

8.1 UPPER UNIT



1. Total counter
2. Exposure lamp
3. Optics anti-condensation heater
4. Thermoswitch
5. Exhaust blower
6. Home position sensor
7. Toner overflow sensor
8. Lens drive motor
9. Lens home position sensor
10. AC drive board
11. Main motor
12. Scanner drive motor
13. Master solenoid
14. Mirror home position sensor
15. Optics board
16. Mirror drive motor
17. Pulse generator sensor
18. Toner end sensor
19. Inlet cooling fan
20. Erase lamp unit/master sensor
21. Operation panel board
22. Main board
23. Auto ID sensor
24. Quenching lamp
25. Charge varistor
26. Charge power pack

8.2 LOWER UNIT



27. Exit sensor
28. Thermistor
29. Fusing lamp
30. Thermofuse
31. Noise filter board
32. Fusing relay
33. Registration sensor
34. DC power supply board
35. Paper size switches
36. Anti-condensation heater
37. Registration solenoid
38. Relay feed solenoid
39. Cassette feed solenoid
40. Tray feed solenoid
41. Paper tray sensor
42. Feed sensor
43. Paper end sensor
44. Paper width sensor 1
45. Paper width sensor 2
46. Paper width sensor 3
47. Paper length seneor
48. Main switch
49. Safety switch
50. Transformer
51. Transfer/bias power pack
52. Fusing power supply board
53. Fusing triac

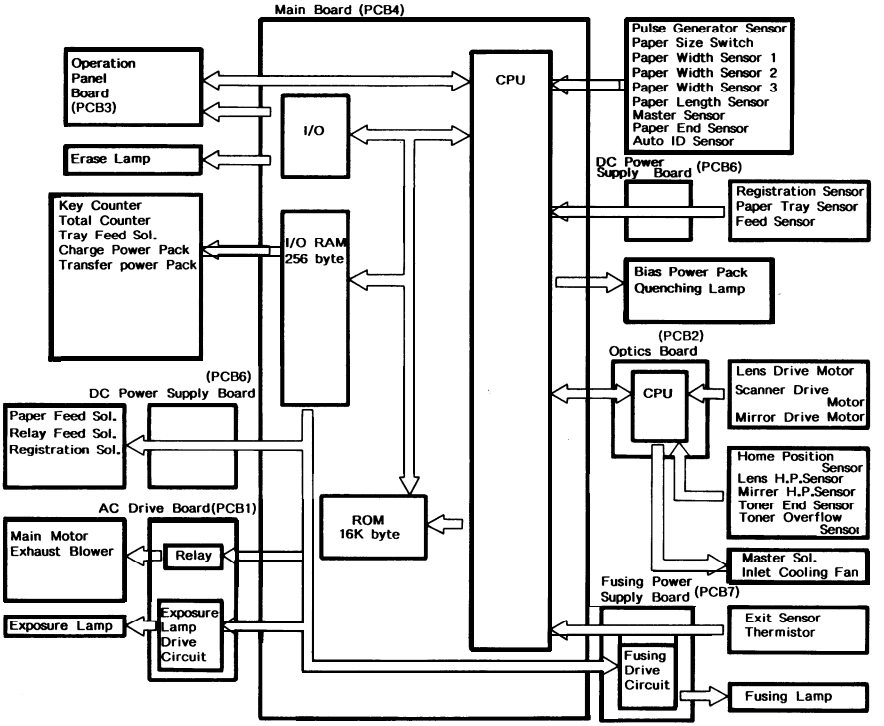
9. ELECTRICAL COMPONENT DESCRIPTIONS

SYMBOL	NAME	FUNCTION	LOCATION
Motors			
M1	Main Motor	Drives all main unit components except for lens, optics, fans and blowers. (100 Vat)	11
M2	Scanner Drive Motor	Drives the scanner. (dc setvomotor)	12
M3	Lens Drive Motor	Positions the lens. (dc stepper motor)	8
M4	Mirror Drive Motor	Positions the 4th and 5th mirrors. (dc stepper motor)	16
M5	Exhaust Blower	Removes heat from around the fusing unit. (100 Vat)	5
M6	Inlet Cooling Fan	Cools the optics cavity. (24 Vdc)	19
Solenoids			
SOL1	Registration Solenoid	Turns on to engage the registration spring clutch.	37
SOL2	Relay Feed Solenoid	Turns onto disengage the relay feed roller spring clutch.	38
SOL3	Tray Feed Solenoid	Turns onto engage the tray feed spring clutch.	40
SOL4	Cassette Feed Solenoid	Turns onto engage the cassette feed spring clutch.	39
SOL5	Master Solenoid	Turns onto disengage the master belt spring clutch.	13
Switches			
SW1	Main Switch	Supplies power to the copier.	48
SW2	Safety Switch	Cuts ac power to the copier when either the front cover or the top unit is open.	49
SW3	Paper size switches	Detect what size paper is in the cassette.	35
Sensors			
S1	Home Position Sensor	Informs the CPU when the scanner is at the home position.	6
S2	Pulse Generator Sensor	Supplies timing pulses to the main board.	17
S3	Toner Overflow Sensor	Detects when the used toner tank is full.	7

SYMBOL	NAME	FUNCTION	LOCATION
Sensors continued			
S4	Lens Home Position Sensor	Detects when the lens is at the full size position.	9
S5	Mirror Home Position Sensor	Detects when the 4th and 5th mirrors are at the full size position.	14
S6	Toner End Sensor	Detects when it is time to add toner.	18
S7	Master Sensor	Detects the sensor plate on the master belt. This sensor is located on the erase lamp unit.	20
S8	Auto ID Sensor	Measures the image density of the original.	23
S9	Exit Sensor	Misfeed detector.	27
S10	Registration Sensor	Misfeed detector.	33
S11	Paper Tray Sensor	Detects whether or not the paper tray is in the down position.	41
S12	Feed Sensor	Sets the off timing for the tray feed solenoid and cassette feed solenoid.	42
S13	Paper End Sensor	Detects when the cassette runs out of paper.	43
S14	Paper Width Sensor 1	Detects the width of paper fed from the paper tray.	44
S15	Paper Width Sensor 2	Detects the width of paper fed from the paper tray.	45
S16	Paper Width Sensor 3	Detects the width of paper fed from the paper tray.	46
S17	Paper Length Sensor	Detects the length of paper fed from the paper tray.	47
Printed Circuit Boards			
PCB1	AC Drive PCB	Provides ac power to the exposure lamp, main motor, exhaust blower, and anti-condensation heater.	10
PCB2	Optics PCB	Controls the scanner, lens, and mirror drive motors.	15
PCB3	Operation Panel PCB	Contains operator indicators and controls.	21
PCB4	Main PCB	Controls all copier functions both directly and through other PCBs.	22
PCB5	Noise Filter PCB	The noise filter is mounted on this board.	31
PCB6	DC Power Supply PCB	Provides power for all dc components.	34
PCB7	Fusing Power Supply PCB	Controls the supply of ac power to the fusing lamp.	52

SYMBOL	NAME	FUNCTION	LOCATION
Lamps			
L1	Quenching Lamp	Neutralizes any charge remaining on the master surface after cleaning.	24
L2	Erase Lamp Unit	Discharges the master's charge outside of the image area. Provides lead/trail edge erase and side erase.	20
L3	Exposure Lamp	Provides light to reflect the original's image onto the master.	2
L4	Fusing Lamp	Provides heat to the fusing unit.	29
Power Packs			
P1	Charge Power Pack	Provides high voltage power for the charge corona.	26
P2	Transfer/Bias Power Pack	Provides high voltage power for the transfer corona and the development roller bias.	51
Transformer			
TR1	Transformer	Steps down the line voltage to 31 Vac,	50
Counters			
CO1	Total Counter	Keeps track of the total number of copies made.	1
CO2	Key Counter	A special counter used for administrative control of copying.	1
Heaters			
H1	Optics Anti-condensation Heater	Keeps moister from forming on the optics.	3
H2	Anti-condensation Heater	Keeps moister from forming inside the copier.	36
Others			
FT	Fusing Triac	Switches fusing lamp on and off.	53
FR	Fusing Relay	Supplies ac power to the fusing power supply board.	32
TS	Thermoswitch	Protects against overheating of the optics cavity. (Opens when its temperature reaches 110°C.)	4
TH	Thermistor	Monitors the hot roller's surface temperature.	28
TF	Thermofuse	Protects against fusing overheat.	30
V	Charge Varistor	Prevents overcharging of the master surface.	25

10. OVERALL MACHINE CONTROL

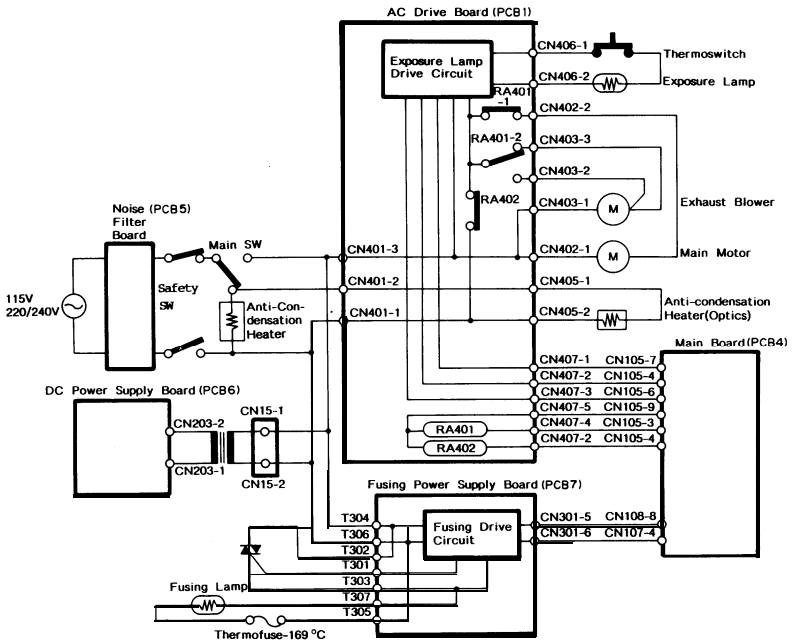


The above diagram shows the control system of the copier in block form. Copier operation is controlled by two CPUs –the main CPU on PCB4 and the optics CPU on PCB2. The CPUs communicate through a serial interface.

The optics CPU controls the three optics drive motors, and receives input from the three optics home position sensors. From the above illustration, it appears that the optics CPU controls the master solenoid and inlet cooling fan, but actually it just acts as an interface for control signals for these components received from the main CPU. Similarly, the optics CPU does not act on signals received from the toner overflow sensor and toner end sensor, but rather transfers these signals to the main CPU.

The main CPU controls all other machine components based on input from the optics CPU and the other sensors. It controls the development bias and quenching lamp, and operation panel directly, but other components are controlled through an I/O chip or the I/O RAM. The transfer corona and development bias are powered by the same power pack (P2) but are controlled separately as shown above.

11. AC POWER DISTRIBUTION



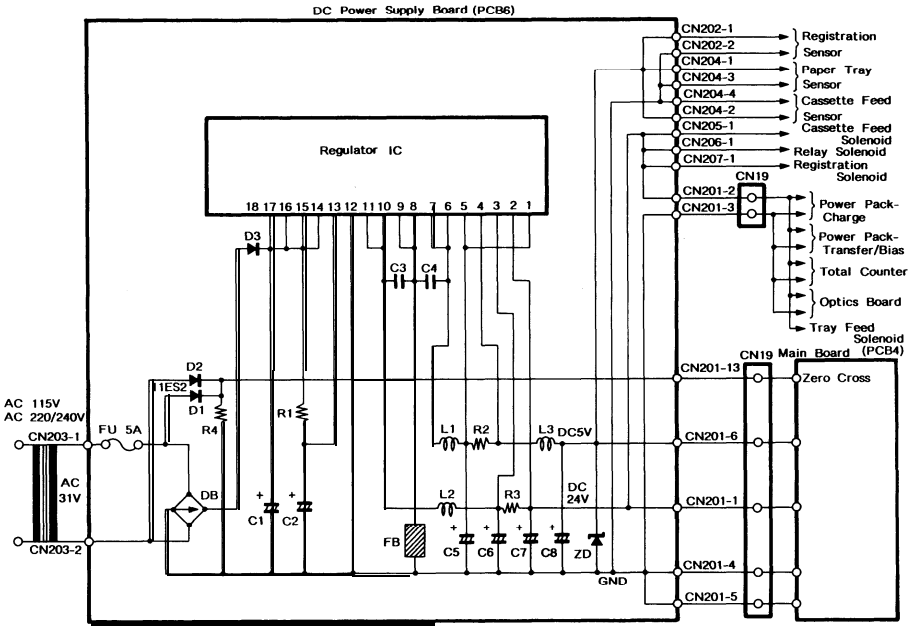
When the machine is first plugged in, ac voltage passes through the noise filter and safety switch to the main switch. With the main switch in the off position, ac voltage is applied to the two anti-condensation heaters.

When the main switch is turned on, ac voltage is removed from the anti-condensation heaters. At this time, ac voltage is supplied to the ac drive board, the dc power supply board, and the fusing power supply board.

When the main board becomes active, it activates the fusing power supply board which then supplies ac power to the fusing lamp, and the exhaust blower begins rotating at low speed (RA402 energizes). When the Start key is pressed, the main board sends a trigger to the exposure lamp drive circuit and the exposure lamp lights. At this time the main board energizes RA401. Then, the main motor turns on and the exhaust blower starts rotating at high speed.

When the main switch is turned off, RA402 also turns off due to a power loss at the main board. Since the contact of RA402 is on a different line from the line that the main switch is on, the exposure lamp is completely disconnected from the line voltage.

12. DC POWER DISTRIBUTION



This copier uses two dc power levels: +5 volts and +24 volts.

The ac power from the wall outlet is stepped down by a transformer to 31 volts ac, which then powers the dc power supply board. The 31 volt ac input is rectified by a diode bridge full-wave rectifier. The rectified power is supplied to the regulator IC, which smoothes the rectified power and reduces the potential to +24 volts and +5 volts.

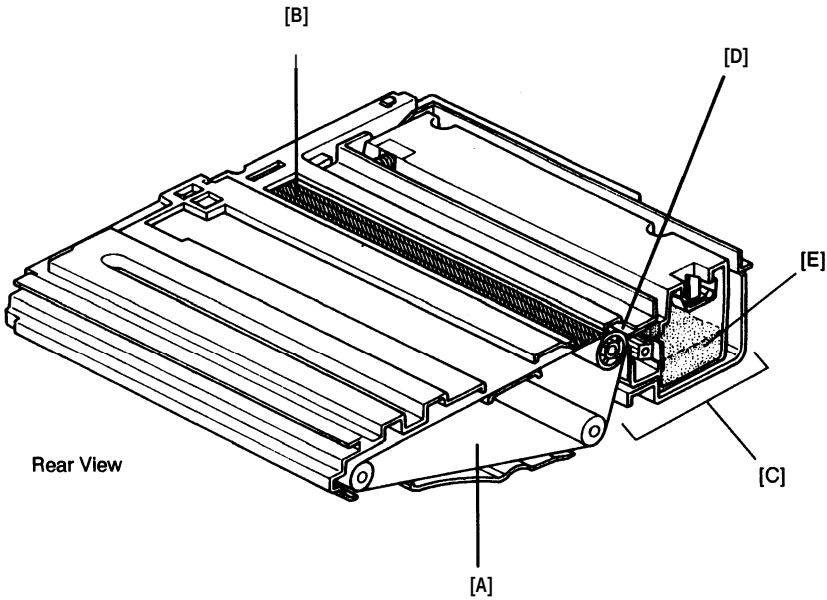
The +24 and + 5 voltages are supplied to the main board. Also +24 volts is supplied to all solenoids, power packs, total counter, and optics board, while + 5 volts powers all sensors and the paper size switches. The rectified power is also supplied to the main board as a zero cross signal.

SECTION 2

DETAILED SECTION DESCRIPTIONS

1. MASTER UNIT

1.1 OVERVIEW



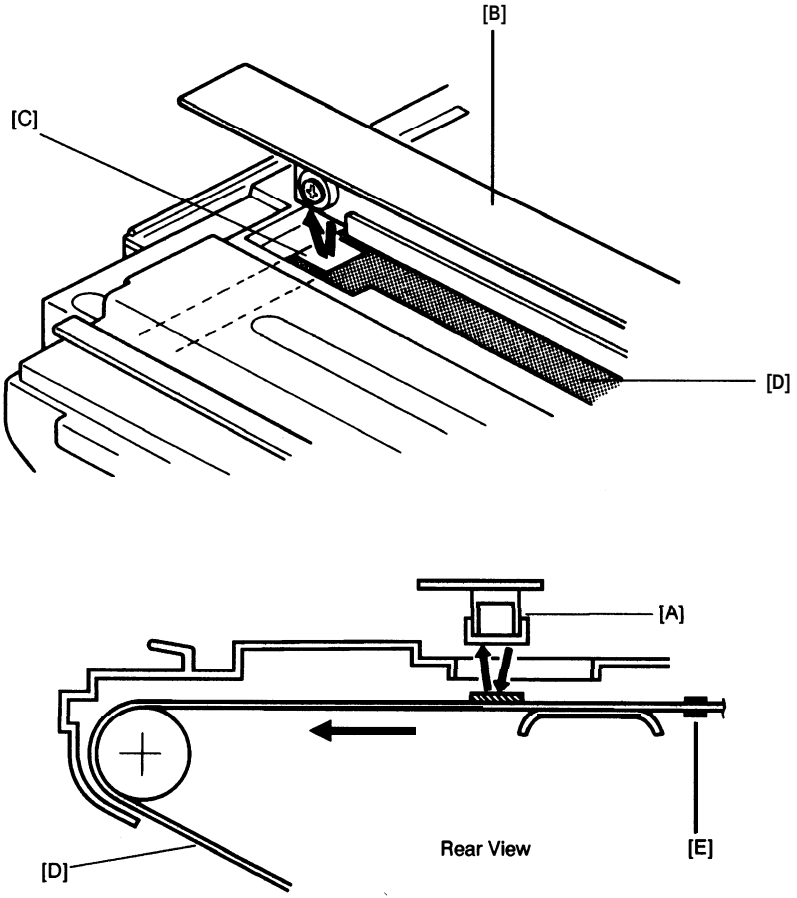
The master unit consists of the master belt [A], the grid plate [B], and the cleaning section [C].

The master is an organic-photoconductive belt. During a multicopy run, the master belt makes one revolution per A4 / 11" x 8½" copy or two revolutions per A3 / 11" x 17" copy.

The stainless steel grid plate makes the charge applied by the charge corona unit uniform. A varistor between the grid plate and ground ensures that an even charge of -900 volts is applied.

The cleaning blade [D] removes any toner remaining on the master belt. This prepares the master belt for the next copy cycle. The toner that is cleaned from the master belt goes into the used toner tank [E].

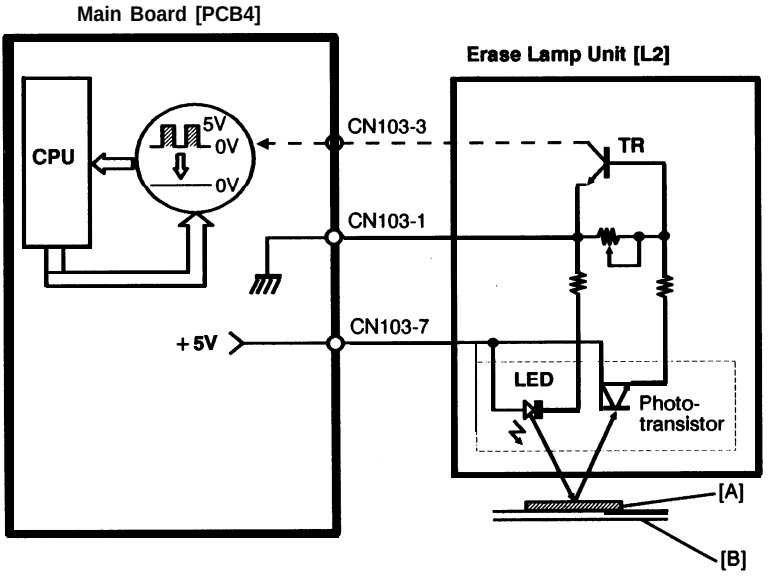
1.2 MASTER SENSOR



Themastersensor [A] is installed on the operator end of the erase lamp unit [B].

The master sensor detects a reflective plate (called the sensor plate [C]) on the edge of the master belt [D] once every master rotation. This tells the CPU the location of the bond-seam [E]. The detection of the sensor plate sets the start timing for most elements of the copy cycle.

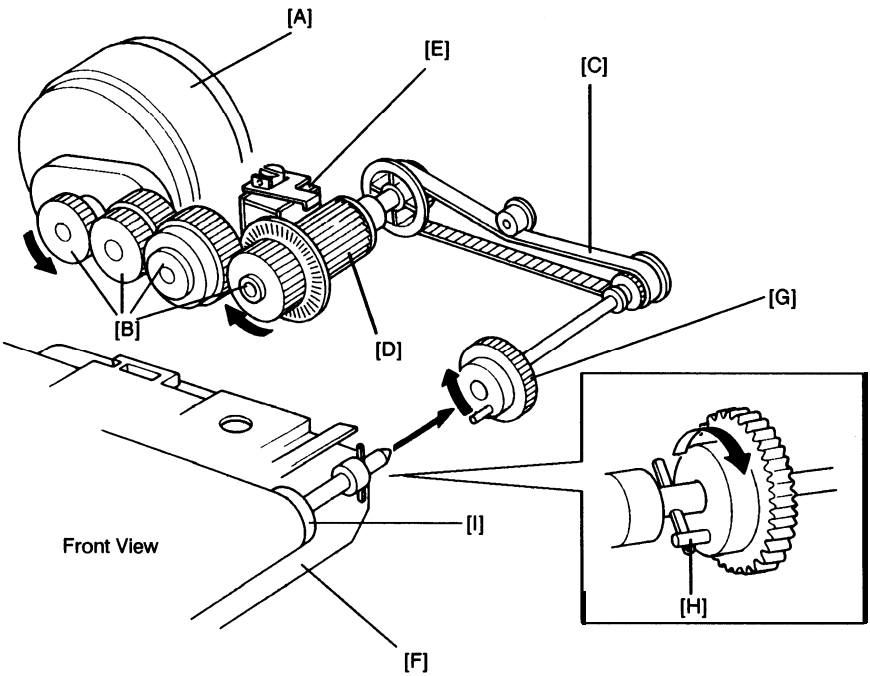
1.3 MASTER SENSOR CIRCUIT



The main board applies + 5 volts from CN103-7 to power the master sensor. To determine whether or not the phototransistor is on, a 5-volt pulse is supplied to CN103-3.

When the sensor plate [A] on the master belt [B] is not under the sensor, the phototransistor is off. So, the 5-volt pulse remains present at CN103-3. When the sensor plate passes under the sensor, the phototransistor turns on. The 5-volt pulse at CN103-3 then drops to 0 volts, informing the CPU of the arrival of the sensor plate.

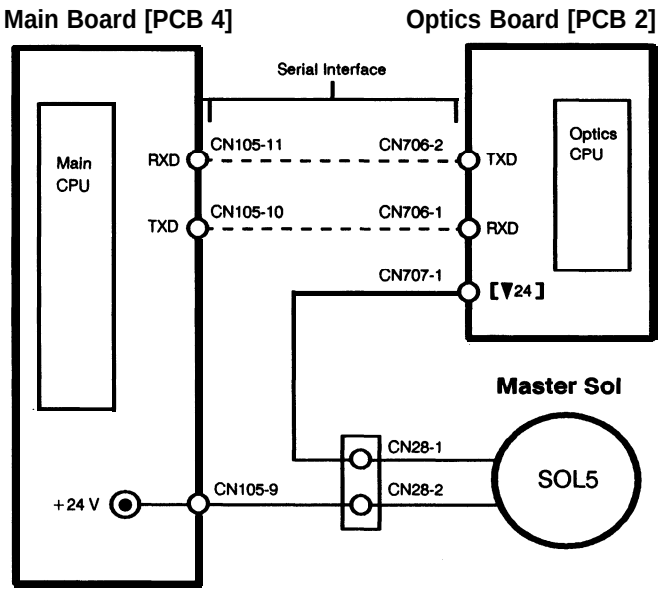
1.4 DRIVE MECHANISM



The main motor [A] supplies drive to the master belt through a series of gears [B] and a timing belt [C]. Drive is controlled by the master clutch [D]. When the master solenoid [E] is energized, the solenoid pawl engages the clutch sleeve and the drive of the main motor is not transmitted to the master unit. When the master solenoid is de-energized, the solenoid pawl disengages from the clutch and rotation is transmitted to the master/development drive gear [G]. A pin [H] on the inside of the master development drive gear turns the master belt drive pulley [I].

The master belt starts rotating (master solenoid de-energized) when the scanner returns to the home position after scanning image density. The master solenoid stays off until after the final copy is complete. Then, at the same time that the main motor turns off, the master solenoid turns on to stop the master belt from rotating. The master solenoid turns off again 199 pulses (2.27s) later.

1.5 MASTER SOLENOID CIRCUIT



The master solenoid is powered by +24 volts from CN105-9 of the main board. To turn on the master solenoid, the optics board drops CN707-1 to ground.

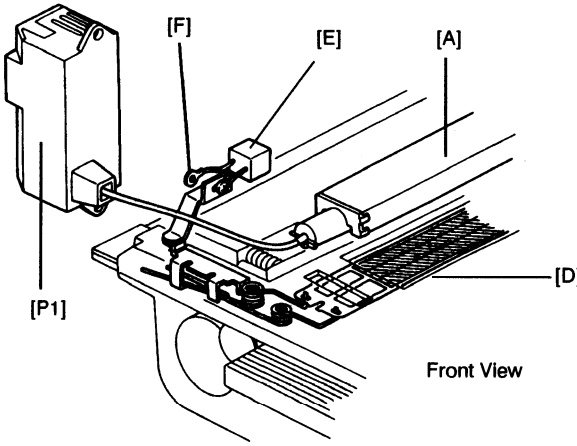
1.6 SERVICE CALL CONDITIONS

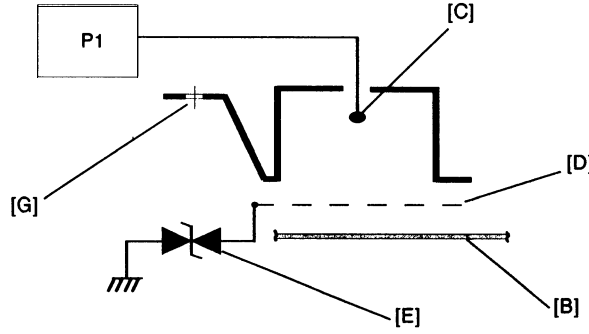
Service Code E71

Service code E71 lights if the CPU does not detect the sensor plate within 6 seconds after belt rotation starts.

2. CHARGE

2.1 OVERVIEW

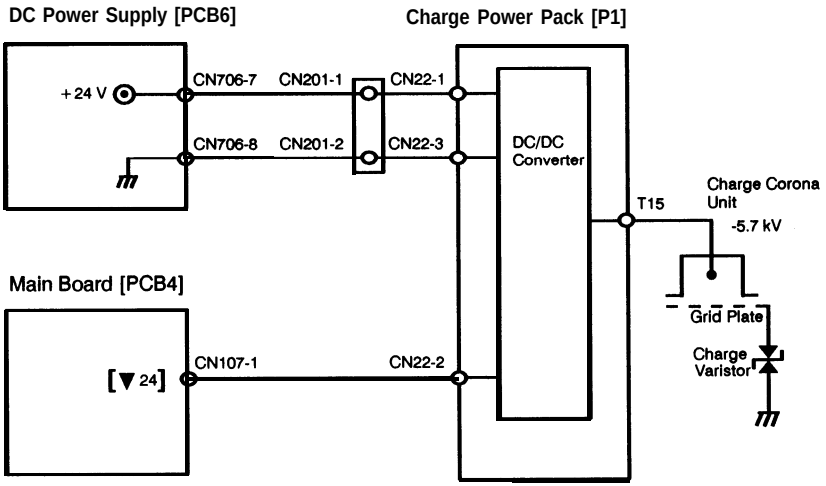




This model uses a single wire corona unit [A] to charge the master [B] (organic photoconductor belt). The corona wire [C] generates a corona of negative ions when a high negative voltage is applied to it by the charge power pack [P1]. To make the negative corona uniform, a thin stainless steel grid [D] is installed on the master unit. A varistor [E] between the grid and ground [F] ensures that an even charge of -900 volts is applied to the master belt. This grid plate sometimes requires cleaning.

The corona unit casing has three ventilation louvers [G] to allow ozone to escape. The ozone is then drawn through an ozone filter by the exhaust blower.

2.2 CHARGE CORONA CIRCUIT

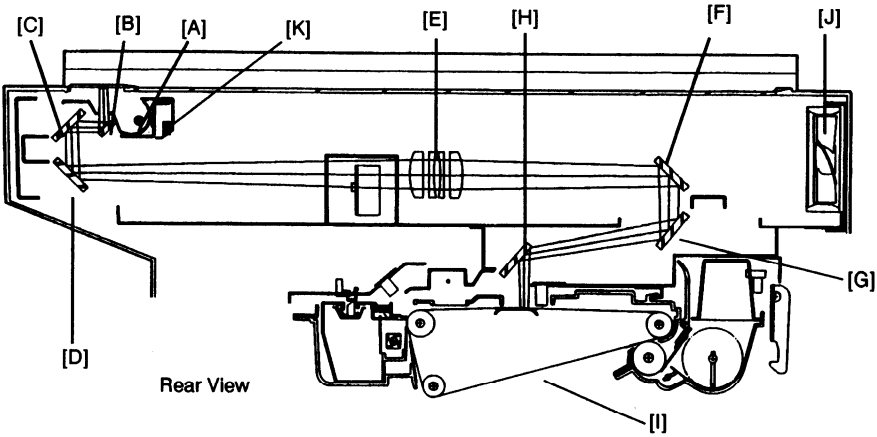


The dc power supply board supplies +24 volts to CN22-1 of the charge power pack as the power supply source. On the 9th pulse after the sensor plate of the master belt is detected, the CPU drops CN107-1 from +24 volts to 0 volt. This actuates the de/de converter within the power pack which applies approximately -5.7 kilovolts to the charge corona wire.

When the grid reaches -900 volts, the varistor begins draining off any excess charge. This ensures that the charge does not fluctuate and an even charge is applied to the master surface.

3. EXPOSURE

3.1 OVERVIEW



During the copy cycle, an image of the original is reflected onto the master belt surface via the optics assembly as follows.

Light Path:

Exposure Lamp [A] → Original → First Mirror [B] →
Second Mirror [C] → Third Mirror [D] → Lens [E] →
Fourth Mirror [F] → Fifth Mirror [G] → Sixth Mirror [H] → Master Belt [I]

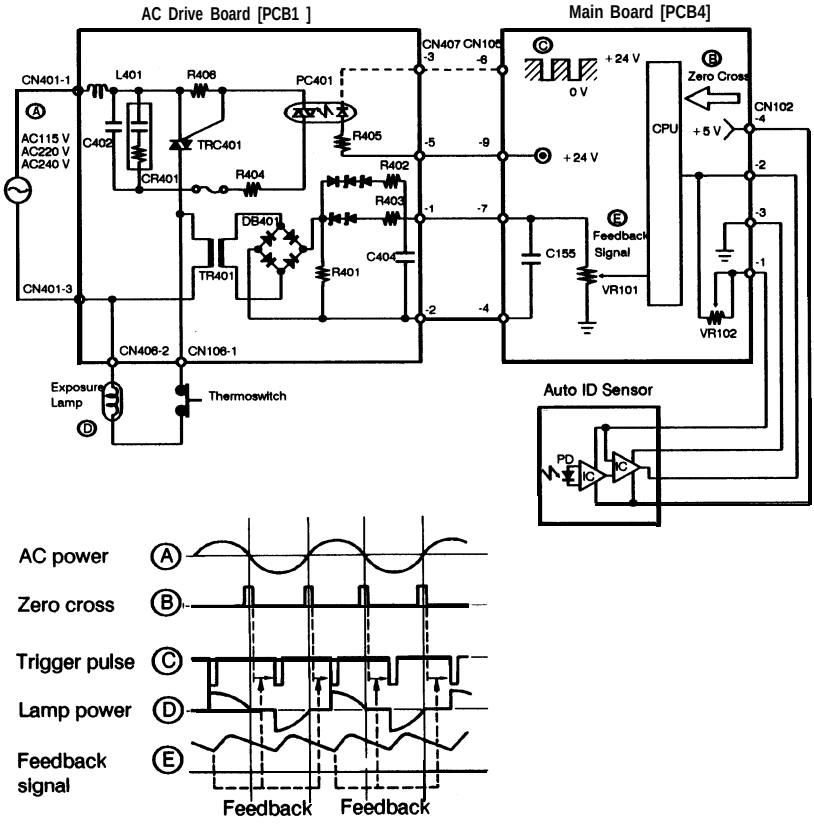
The inlet cooling fan [J] draws cool air into the optics cavity. The air flows from the right to the left in the optics cavity and exhausts through the vents in the upper cover. This fan operates during every copy cycle.

This model has six standard reproduction ratios: three reduction ratios, two enlargement ratios, and full size. In addition, it has a zoom function. The user can change the reproduction ratio in one percent steps from 50% to 200%.

Stepper motors are used to change the positions of the lens and mirrors. Separate motors are used because the wide range of reproduction ratios makes it mechanically difficult for one motor to position both the lens and mirrors. For scanner drive a servomotor is used. This motor changes the scanner speed depending on the reproduction ratio. The two stepper motors and the scanner drive motor are controlled by the optics board (PCB2).

The thermoswitch [K] located on the first scanner next to the exposure lamp is designed to open at 110 degrees Celsius. Should this occur all power to the exposure lamp is removed. The thermoswitch resets as the exposure area cools.

3.2 EXPOSURE LAMP CONTROL CIRCUIT



The main board sends lamp trigger pulses to the ac drive board from CN105-6. PC401 activates TRC401, which provides ac power to the exposure lamp, at the trailing edge of each trigger pulse.

The voltage applied to the exposure lamp is also provided to the feed back circuit. The feedback circuit steps down (TR401), rectifies (DB401), and smoothes (zener diodes and capacitors) the lamp voltage. The CPU monitors the lowest point of the smoothed wave (feedback signal). the lowest point of this signal is directly proportional to the actual lamp voltage.

The auto ID sensor measures the image density of the original on the pre-scan cycle prior to copying. In case of overheating, the thermoswitch opens at 110 degrees celsius and removes ac power to the exposure lamp.

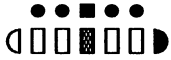
- Lamp Voltage Compensation -

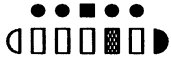
Compensation processing consists of changing the timing of the exposure lamp trigger in response to the feedback voltage. If the lamp voltage is too low, the CPU sends the trigger pulses earlier so that more ac power is applied to the exposure lamp. The compensation is performed instantly; so, the lamp voltage is always stable even under fluctuating ac power conditions.

The feed-back voltages for each of the manual image density levels are shown below. (In actual operation, these values are slightly modified by the reduction/enlargement exposure correction.)

1.69 V

1.78V


1.90 V


2.06 V

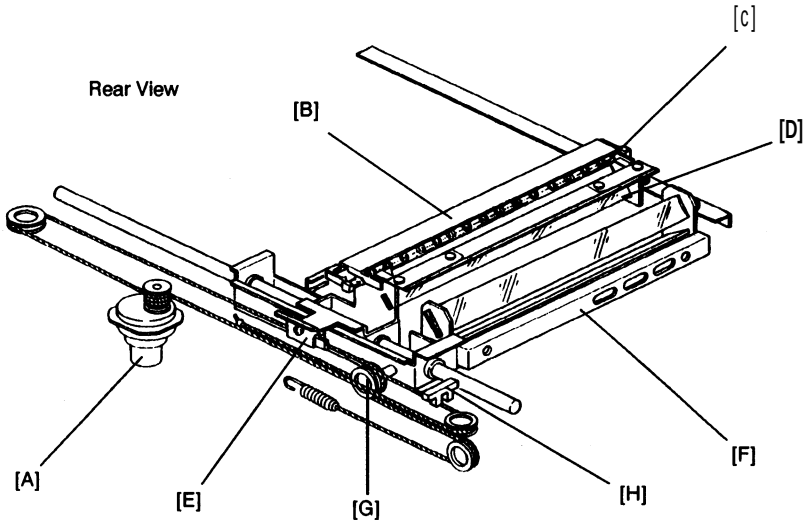
2.24 V

- Manual Image Density Control -

ID Level	1	2	3	4	5
Lamp Voltage 115 V machine	65	68	71	75	80
Lamp Voltage 220/240 V machine	133	137	144	153	164

The above table shows the approximate voltage applied to the exposure lamp at each manual image density level.

33 SCANNER DRIVE MECHANISM



This model uses a dc servomotor [A] to drive the scanners.

The first scanner [B], which consists of the exposure lamp [C] and the first mirror [D], is connected to the scanner drive wire by the wire clamp [E]. The second scanner [F], which consists of the second and third mirrors, is connected to the scanner drive wire by a movable pulley (the second scanner pulley [G]).

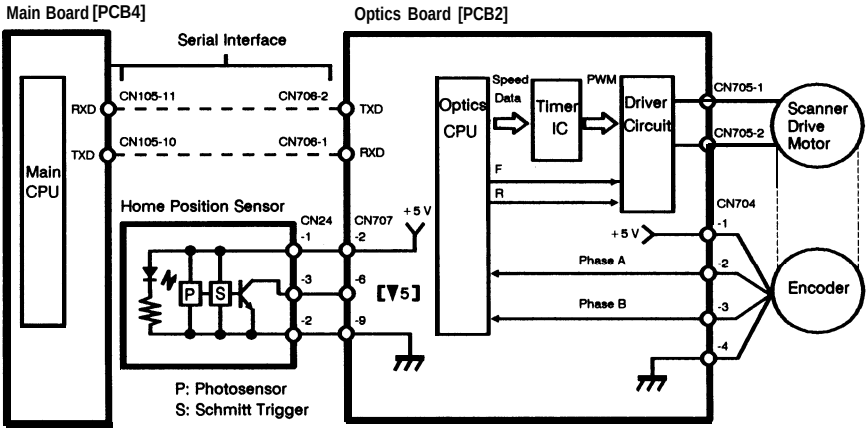
The pulley moves the second scanner at half the velocity of the first scanner. This is to maintain the focal distance between the original and the lens during scanning. This relationship can be expressed as:

$$V1r = 2(V2r) = VM/r$$

where:
- **r = Reproduction ratio**
- **V1r = First scanner velocity (when the reproduction ratio is "r")**
- **V2r = Second scanner velocity (when the reproduction ratio is "r")**
- **VM = Master belt velocity (115 mm/s)**

The wire clamp for the first scanner also works as the actuator of the scanner home position sensor [H].

3.4 SCANNER DRIVE CIRCUIT



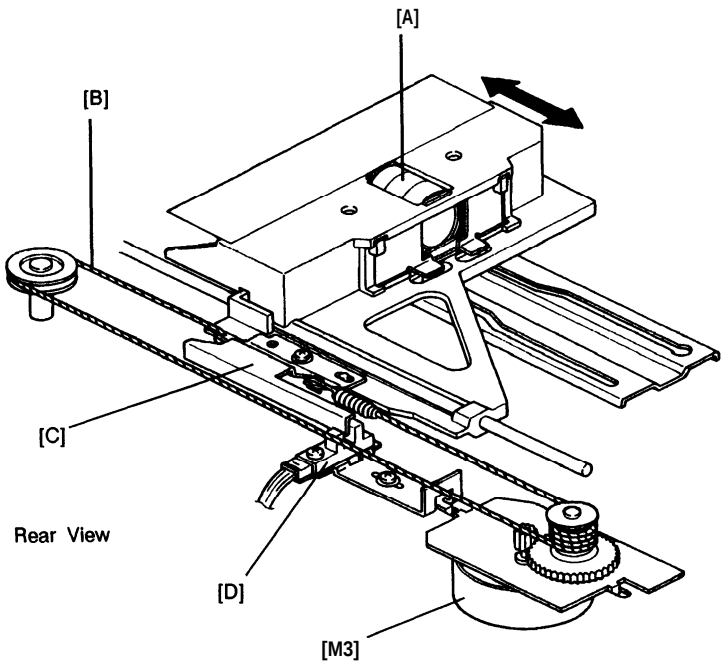
A dc servomotor is used as the scanner drive motor. The optics CPU controls the speed of the servomotor. The main CPU and the optics CPU communicate through a serial interface.

The optics CPU sends the speed data for the selected reproduction ratio to a timer IC on the optics board. The timer IC sends the pulse-width-modulation (PWM) signal to the driver circuit, which sends drive pulses to the scanner drive motor.

An encoder in the servomotor has two photosensors that generate two pulse signals (Phase A and Phase B). The optics CPU monitors the scanner speed and direction by these pulse signals and uses this data to regulate the servomotor's speed.

The home position sensor monitors the position of the scanner. When the main switch is turned on, the CPU confirms the position of the scanner by moving the scanner out of home and back. With the scanner in the home position the sensor is blocked by the wire clamp and +5 volts can be read at CN707-6.

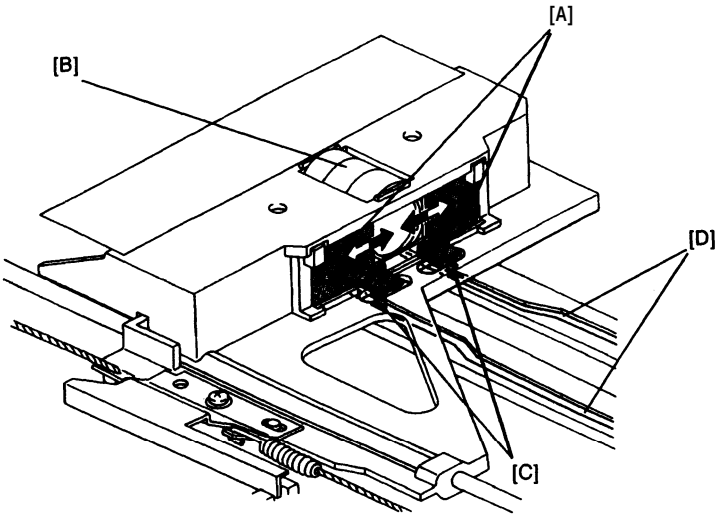
3.5 LENS DRIVE MECHANISM



The lens drive motor [M3], which is a stepper motor, changes the position of the lens [A] in accordance with the selected reproduction ratio to provide the proper optical distance between the original and the lens.

When the lens drive motor is energized, rotation is transmitted to the lens unit through a drive wire [B], which is hooked to the lens unit drive clamp [C]. The lens unit drive clamp also works as the actuator of the lens home position sensor [D].

3.6 LIGHT SHADING MECHANISM



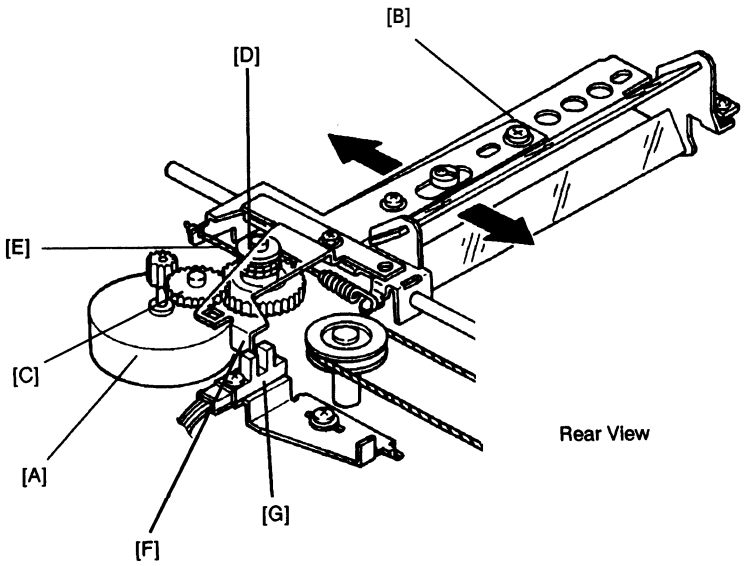
Rear View

The intensity of the light striking the master belt during exposure tends to increase toward the edges when the reproduction ratio is decreased. This is because the reflected light is focused through the lens. For this reason, a light shading mechanism has been installed to prevent uneven illumination when making reduced copies.

Two shading plates [A] are installed just in front of the lens [B]. Each shading plate has a pin [C] which engages with a groove cam [D]. The two groove cams are symmetrical with the lens axis, so the two shading plates always move exactly the same amount.

When the lens moves in the reduction direction, the groove cams move the shading plates closer together. The plates block part of the light passing through the lens to keep the intensity of light on the master belt even.

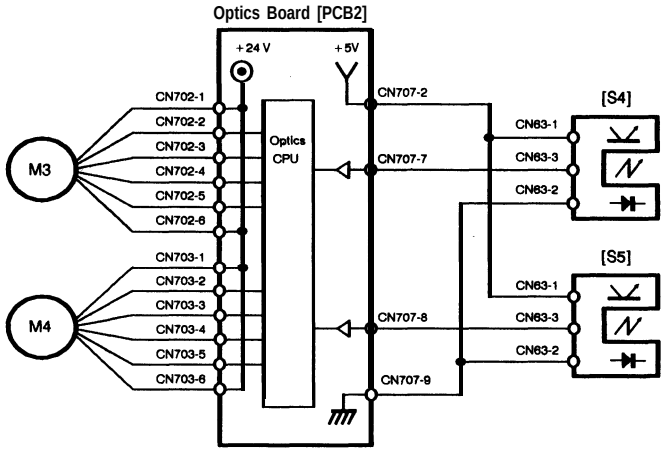
3.7 MIRROR DRIVE MECHANISM

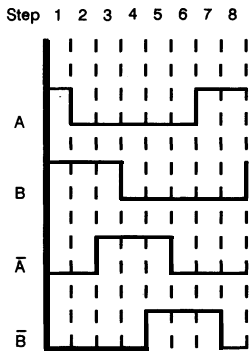


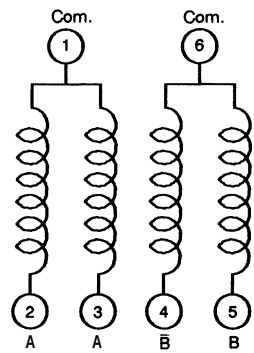
To provide the proper optical distance between the lens and the master belt for the various reproduction ratios, this model uses a stepper motor [A] to move the mirror assembly [B]. This motor (the mirror drive motor) turns an idle gear [C] which turns the mirror drive pulley [D]. A short drive wire [E] moves the mirror assembly.

A tab [F] on the mirror home position actuator activates the mirror home position sensor [G].

3.8 STEPPER MOTOR CONTROL



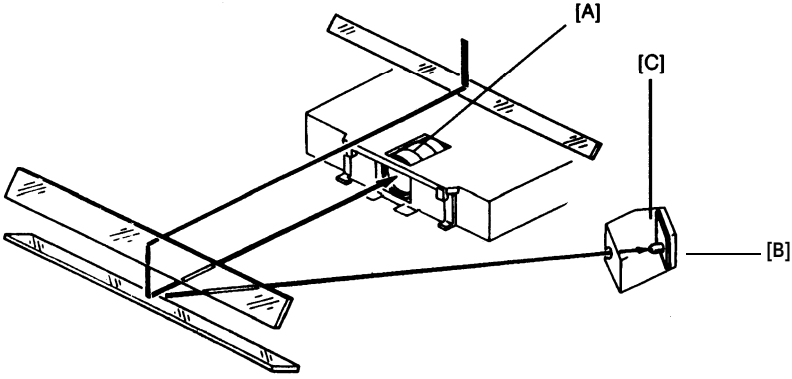


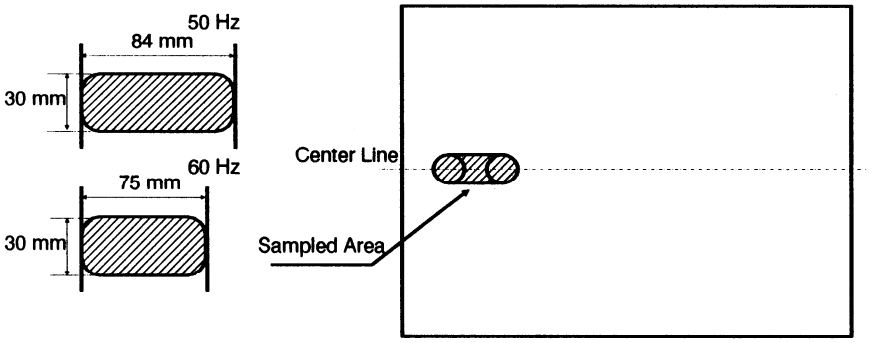


Both the lens drive motor [M3] and the mirror drive motor [M4] are stepper motors. The stators of these stepper motor have four coils (labeled A,B,A and B above), and the rotor is made of permanent magnets. The four coils are energized by pulse signals as shown in the above illustration. The rotors of these motors turn in discrete steps, and 96 steps are required for one revolution.

The lens home position sensor and mirror home position sensor inform the optics CPU when the lens and mirror assembly are at their respective full size positions (home position). The optics CPU determines the lens and mirror assembly stop positions in reduction and enlarge modes by counting the number of steps the motors make with reference to their home positions.

3.9 AUTOMATIC IMAGE DENSITY CONTROL

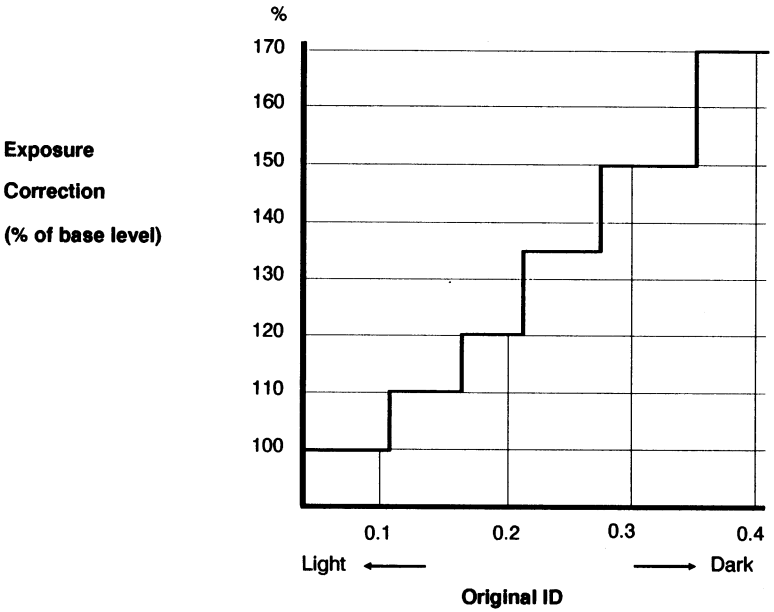




Light from the exposure lamp is reflected from the original and travels to the lens [A] via mirrors. The auto ID sensor [B], which is a photodiode, is mounted on the upper front frame. The sensor cover [C] has a hole in it to allow light to fall directly onto the auto image density sensor. The auto ID sensor samples a strip of the original on the return part of the pre-scanning cycle. While sampling, manual image density level 3 is selected for consistent reference. Sampling starts 88 or 79 millimeters from the leading edge of the original (depends on the electrical frequency) and continues to 14 millimeters from the leading edge of the original. This means that the sampled area for 50 Hz machines is slightly larger than for 60 Hz machines.

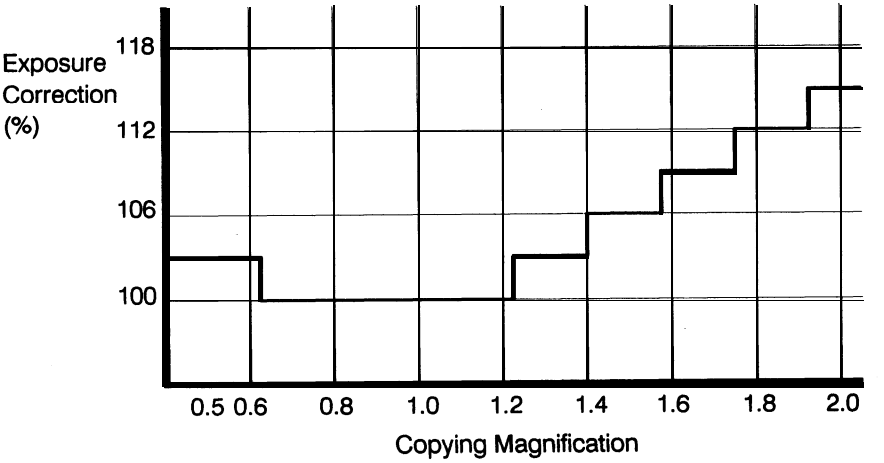
The photosensor circuit converts the light intensity to voltage. The detected voltage is amplified and sent to the main PCB. The CPU stores the voltage of each sampled point in RAM. It then computes the image density of the original from the maximum sample voltage and adjusts the exposure value of the exposure lamp accordingly

3.10 AUTO ID EXPOSURE CORRECTION



When in automatic ID control mode, the CPU uses the manual ID mode's central value (level 3) as the base value This is the voltage that is applied to the exposure lamp if the auto ID sensor detects pure white paper. As shown in the above chart, the exposure level (light intensity) is increased in steps as the original image density becomes darker.

3.11 REDUCTION/ENLARGEMENT EXPOSURE CORRECTION



For the reduction and enlargement reproduction ratios the light path is longer than for the full size reproduction ratio. For this reason, the strength of the exposure lamp output is increased when reduction or enlargement is selected. The above chart shows the percentage of light intensity increase for various reproduction ratios.

3.12 SERVICE CALL CONDITIONS

Service Code E12

Service code El 2 lights if the feedback signal becomes higher than 4.2 volts or less than 0.5 volt when the exposure lamp is on. It will also light if the feedback signal becomes higher than 1 volt when the exposure lamp should be off .

Service Code E13

Code E13 lights if the CPU does not receive the zero cross signal within 0.56 second.

Service Code E20 (main board check)

Code E20 lights if the main CPU does not receive the ready signal from the optics CPU within 10 seconds after the main CPU sends a signal to change the reproduction ratio.

Service Code E21 (optics board check)

Lights if the scanner is more than 0.4 second late in returning to the home position when in a multicopy run or in auto ID pre-scan.

Service Code E22 (optics board check)

Code E22 lights if the scanner home position sensor stays on for longer than the equivalent of 6.3 meters of scanner travel as measured by the servomotor.

Service Code E24 (main board check)

Code E24 lights if the scanner home position sensor does not turn on before the scanner start time when in a multi-copy run.

Service Code E28 (optics board check)

Code E28 lights if the lens home position sensor does not change from HIGH to LOW within 6.4 seconds when the lens moves from the reduction side to the enlargement side.

Service Code E29 (optics board check)

Code E29 lights if the lens home position sensor does not change from LOW to HIGH within 6.4 seconds when the lens moves from the enlargement to the reduction side.

Service Code E2A (optics board check)

Code E2A lights if the mirror home position sensor does not change from LOW to HIGH within 3.5 seconds when the mirrors move to the home position from the reduction/enlargement side.

Service Code E2B (optics board check)

Code E2B lights if the mirror home position sensor does not change from HIGH to LOW within 3.5 seconds when the mirror assembly leaves the home position.

Service Code E2C (optics board check)

Code E2C lights if the scanner travels faster than 670 mm/s.

Service Code E2D (optics board check)

Code E2D lights if no encoder pulse is received for 118 milliseconds during the copy cycle.

Service Code E2U (main board check)

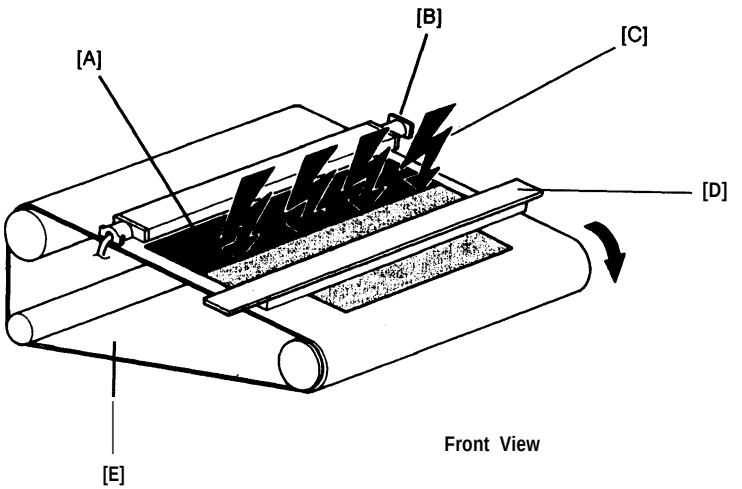
Code E2U lights if the home position sensor stays on for longer than 1.3 seconds after the scanner starts moving.

Service Code E93

Code E93 lights if an irregular signal is sent from the optics board to the main board.

4. ERASE

4.1 OVERVIEW

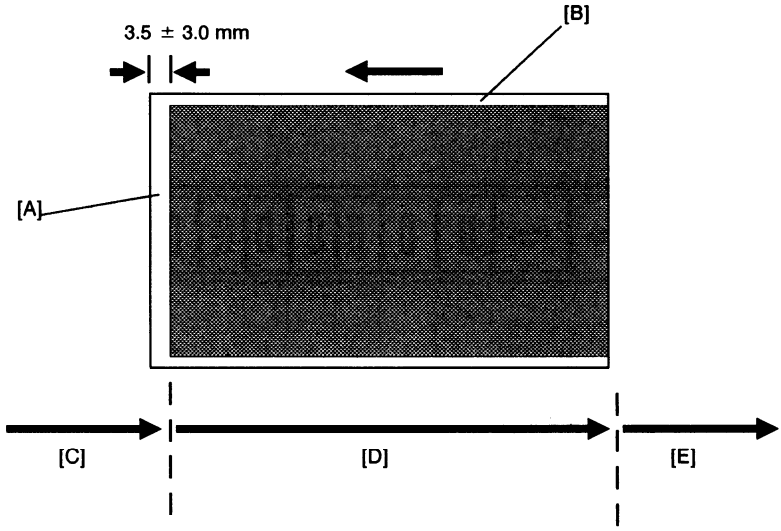


[A] : Charged Area
[B] : Charge Corona Unit
[C] : Exposure

The erase lamp unit [D] consists of a row of LEDs extending across the full width of the master belt [E]. After the moving master belt is exposed, the latent image passes under the erase lamp.

The amount of erasure depends on paper size and reproduction ratio. The erase lamp removes charge from the areas on the master with no latent image, such as the leading, trailing, and side edges of the copy. Thus, non-image areas are not developed which minimizes toner consumption and cleaning load.

4.2 LEADING AND TRAILING EDGE ERASE



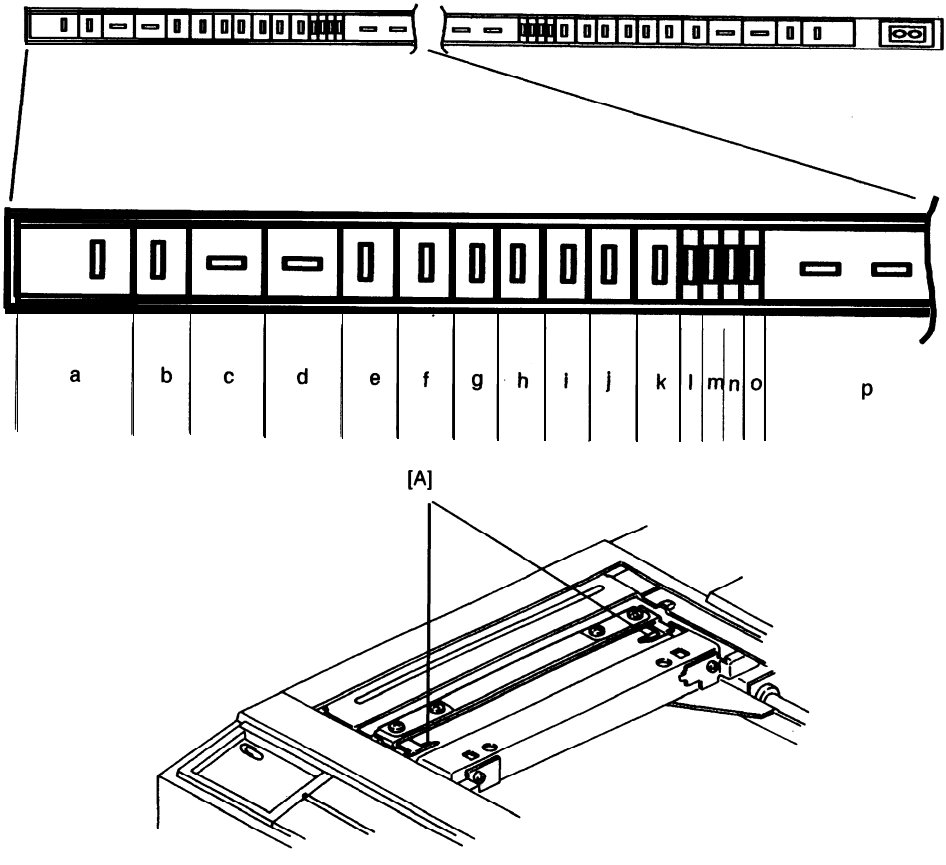
[C]: Leading Edge Erase
[D]: Side Erase
[E]: Trailing Edge Erase

In the above illustration, the outer rectangle represents the entire image area. The inner shaded rectangle shows the image area remaining after leading edge and side erase.

The entire line of LEDs turn on at the start of forward scanning (when the master sensor detects the sensor plate on the master belt). The LEDs stay on until erasure slightly overlaps the leading edge of the latent image on the master belt [A]. This prevents the edge of the original from appearing on the copy image. At that point, side erase [B] starts (see the next page).

The entire line of LEDs turns on again for trailing edge erase after the latent image has passed. Therefore, trailing edge erase cannot be observed on the copy. The LEDs stay on until erasure slightly overlaps the leading edge of the latent image on the next copy cycle. After the final copy, the erase lamps turn off at the same time as the main motor.

4.3 SIDE ERASE



The LEDs of the erase lamp unit turn onto remove the charge on the master. Based on copy paper size and the reproduction ratio, the LEDs turn on in blocks (labeled a - p above). The side reflectors [A] on the first scanner also perform side edge erase.

The following table shows which LEDs of the erase lamp are turned on for each reproduction ratio.

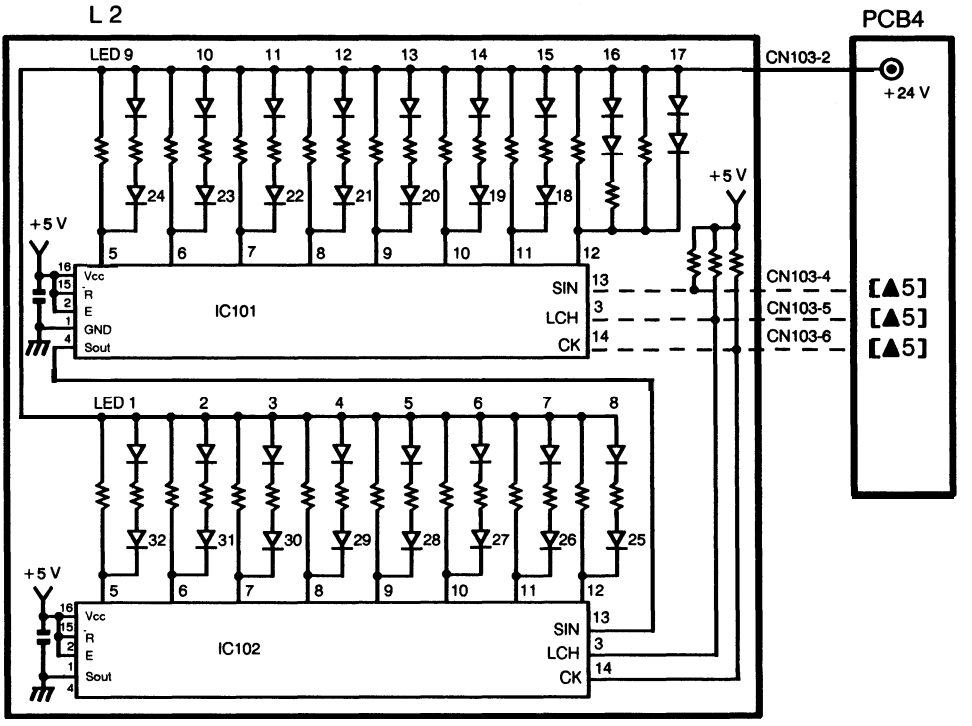
Blocks On	Paper Size	Reproduction Ratio (%)
None	A3, A4 sideways	99-200
a	11" x 17", 11" x 8½"	96-98
a – b	10½" X 8	91-95
a – c	B4	86-90
a – d		82-85
a – e		78-81
a - f	8½" x 11", 8½" x 5½", A4 lengthwise	74-77
a – g	8"X11"	70-73
a – h		67-69
a - i	B5 lengthwise	64-66
a – j		61-63
a - k		58-60
a - l		56-57
a – m		54-55
a – n	A5 lengthwise	52-53
a - o	5½" x 8½"	50-51

The following table shows the maximum side erase margins for various paper size and repoduction ratio combinations.

- Side Erase Margins -

	Full Size		Enlarge/Reduce	
	Maximum margin	Total of both sides	Maximum margin	Total of both sides
A3 and A4 sideways	1.5 ± 2mm	3.5mm	2.5 ± 2mm	5mm
Other sizes	2.0 ± 2mm	4.0mm	2.0 ± 2 mm	4.0mm

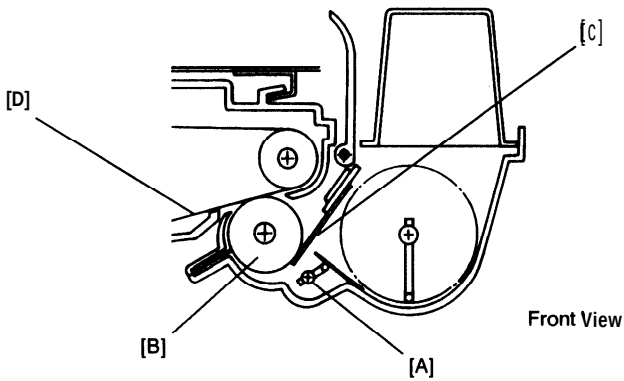
4.4 ERASE LAMP CIRCUIT



This copier uses two shift registers (IC101 and IC102) to drive the erase lamp unit. Erase lamp data is input one bit at a time through CN103-4. At each clock pulse from CN103-6 the data in the shift registers shifts one step to the left. When all the erase data is loaded into the shift registers, the CPU sends the LATCH signal to activate the erase lamp LEDs.

5. DEVELOPMENT

5.1 BLACK DEVELOPMENT



5.1.1 Introduction

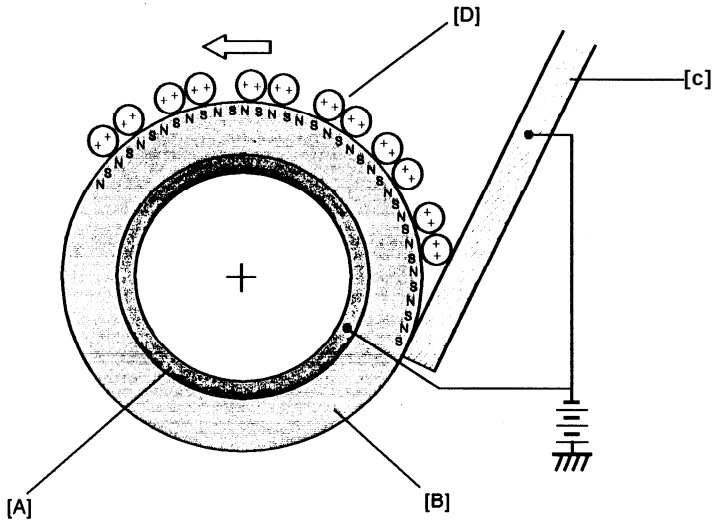
The development unit transforms the electric latent image on the master surface into a visible toner image.

The toner supply bar [A] carries toner from the toner tank to the development roller [B]. The development roller rotates in the same direction as the master belt. Toner adheres to the development roller because the roller has a magnetic rubber layer. As the development roller turns past the toner metering blade [C], only a thin coating of positively charged toner particles stays adhered to the development roller.

After that, the development roller turns past the master belt [D]. The negatively charged latent image on the master surface attracts toner from the development roller, making the image visible on the master surface.

5.1.2 Black Ferrite Toner

This model uses monocomponent toner, which is composed of resin and ferrite. Attraction between the ferrite and the magnetic rubber layer causes the toner to adhere to the development roller. This toner also has a high electrical resistance, which gives it good development and image transfer characteristics, even under high humidity conditions.



5.1.3 Development Roller

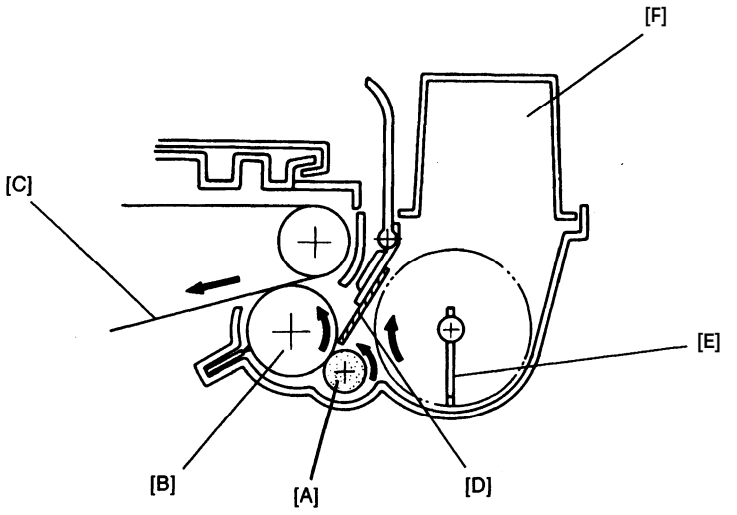
The development roller used in this copier has two layers. At the core there is a conductive layer [A] to which the development bias is applied. Around that, there is a magnetic rubber layer [B], which has closely spaced, alternating north and south magnetic poles. The development roller rotates at 351 rpm.

5.1.4 Toner Metering Blade

The toner metering blade [C] is made of an iron based material. It is attracted against the development roller by the magnetic field of the magnetic rubber layer. The toner metering blade vibrates because of rapid changes in the magnetic field as the roller turns. The vibration allows toner to pass by and prevents foreign matter from being caught on the edge of the metering blade.

Toner particles [D] receive a positive triboelectric charge as they move past the toner metering blade. This charge is created by the rubbing action of the development roller, toner, and toner metering blade.

5.2 COLOR DEVELOPMENT



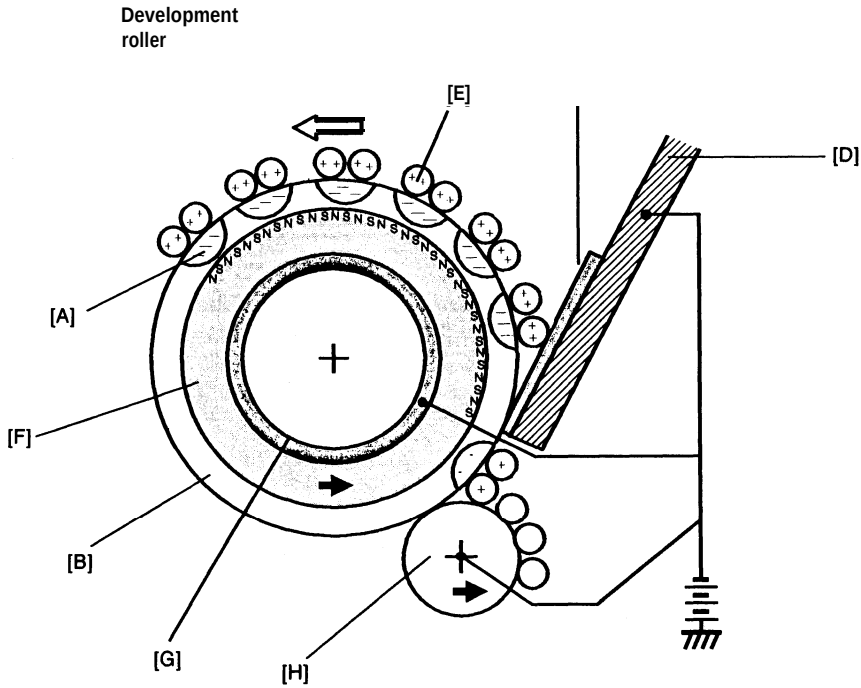
[C]: Master Belt
[D]: Toner Metering Blade
[E]: Toner Mixing Bar
[F] : Toner Cartridge

5.2.1 Color Toner

The major difference between color development and black ferrite development is that colored toner contains no ferrite material. Colored toner adheres to the development roller because of electrostatic force rather than magnetic force.

5.2.2 Color Development

The toner supply roller [A] is made of foam rubber. It carries colored toner from the toner tank to the development roller [B]. Since these two rollers rub against each other in opposite directions, the friction causes the toner to become positively charged. At this point, the level of triboelectric charge is still insufficient to fully develop the latent image with the colored toner.



[F] : Magnetic Rubber Layer
[G] : Conductor
[H] : Toner Supply Roller

5.2.3 Color Development Roller

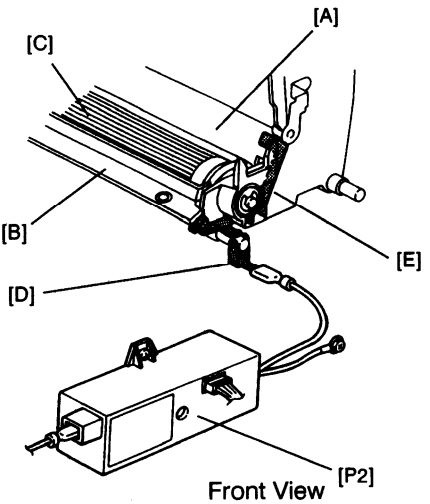
Unlike the black toner development roller, the color development roller has an insulating layer over the magnetic rubber layer. Floating electrodes [A] are embedded in the insulating layer [B]. These floating electrodes are made of carbon, which has a high coefficient of friction and a low electrical resistance, and, thus, helps in creating triboelectric charge.

Color toner has a tendency to adhere to itself. So, a plastic film [C] is installed on the toner metering blade [D] to make sure only a thin coating of color toner particles [E] adhere to the development roller. This film rubs against the development roller increasing the triboelectric charge. This raises the level of triboelectric charge to the point where color toner can fully develop the latent image on the master belt.

5.3 BIAS

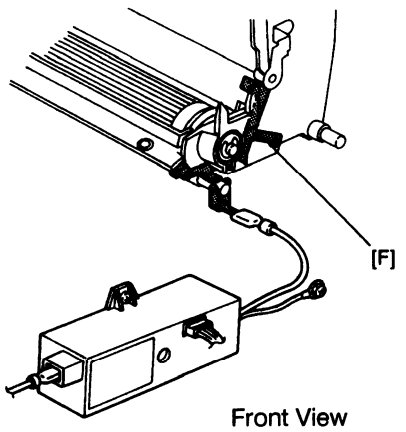
5.3.1 Black Development

The development bias (which is fixed at –225 volts) is applied to the toner metering blade [A], to the bias brush [B], and to the core of the development roller [C] by the transfer/bias power pack [P2]. The bias is applied through the bias terminal [D] and bias plate [E]. The bias charge attracts the positively charged toner to the roller surface preventing the background of the latent image being developed. The bias brush keeps the development roller voltage stable by bleeding off any excess charge.

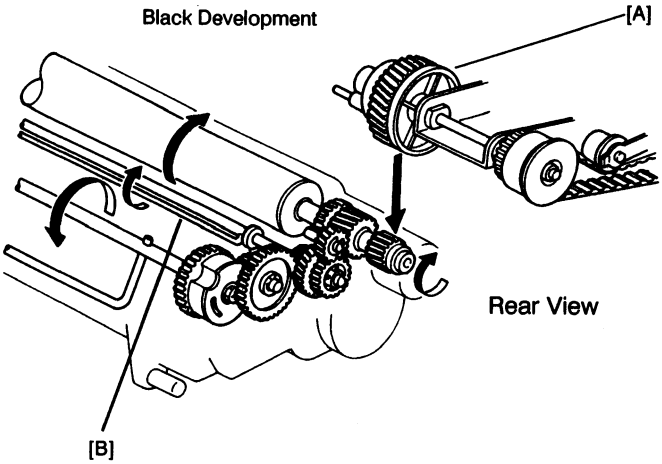


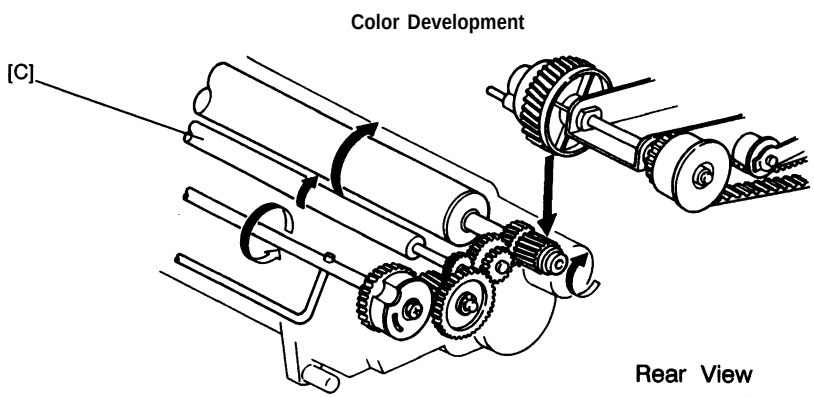
5.3.2 Color Development

For color developing, -180 volts is applied to the bias brush, to the toner supply roller, to the core of the development roller, and to the toner metering blade by the bias plate [F]. The toner supply roller keeps the development roller voltage stable by bleeding off any excess charge in the same manner as the bias brush.



5.4 DRIVE MECHANISM



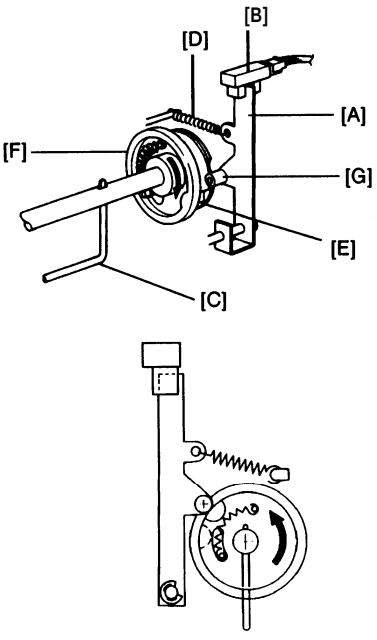


The master/development drive gear [A] drives the development unit as well as the master. This means that the development rotation is also controlled by the master solenoid.

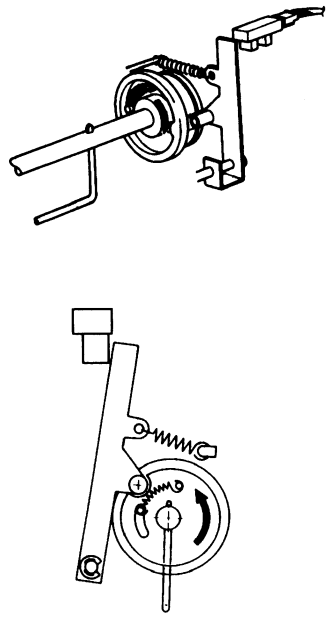
Toner supply bar [B] in the black and the toner supply roller [C] in the color development unit rotate in the same direction, but the gear ratio is different. The toner supply roller gear in the color development unit has a much higher gear ratio, so it rotates faster. The faster rotation helps to generate more triboelectric charge.

5.5 TONER END MECHANISM

Sufficient Condition



Insufficient Condition

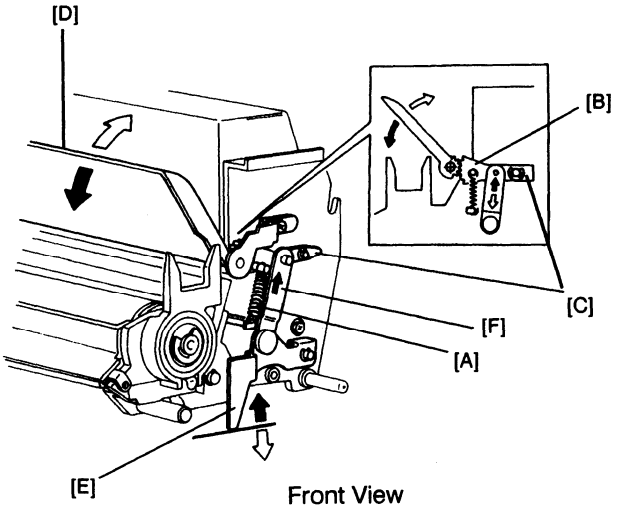


The toner end detection mechanism uses an actuator [A] and a photointerrupter (the toner end sensor [B]). When the toner tank contains enough toner, the actuator stays in the photointerrupter. When the toner tank contains an insufficient amount of toner, the actuator leaves the photointerrupter every revolution of the toner agitator gear.

If there is sufficient toner in the toner tank, the toner resists the movement of the toner mixing bar [C] and the drive spring [D] stretches. As a result, the toner end cam [E] and the toner mixing gear [F] do not align and the actuator roller [G] stays on the surface of the toner mixing gear.

The figures above and to the right show the toner end condition. In this case, the amount of toner in the tank is insufficient to resist the movement of the toner mixing bar. The drive spring pulls the toner end cam and aligns it with the toner mixing gear. When the actuator roller comes to the aligned recess in the cam/gear, the spring pulls the roller into the recess and the actuator goes out of the toner end sensor for a moment. As soon as the detent in the toner mixing gear moves, the actuator re-enters the toner end sensor.

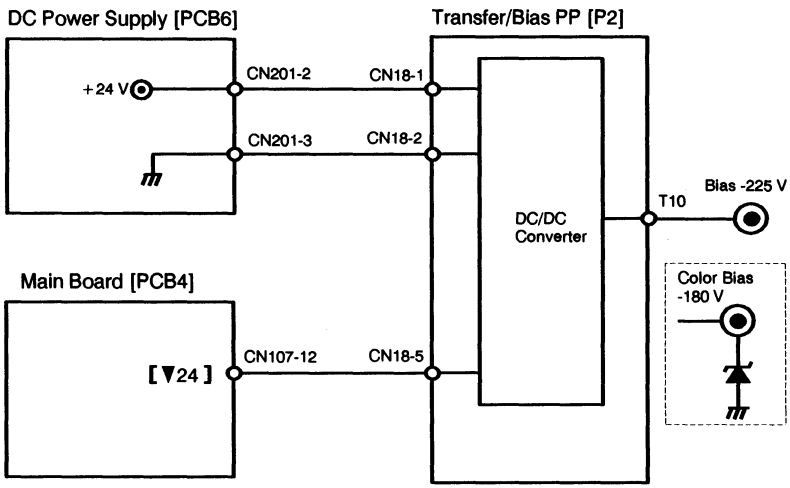
5.6 DEVELOPMENT COVER MECHANISM



When the development unit is in the copier, the cover spring [A] rotates the development cover lever clockwise as shown by the white arrow. The sector gear [B] on the cover lever [C] turns the cover gear, opening the development roller cover [D]. At this time, the cover arm [E] enters a slot on the upper feed guide which is lower than the base of the development unit.

When the development unit is removed from the copier and set on a table, the table forces the cover arm up. This moves the cover link [F] and the cover lever upward, and the development roller cover closes as shown by the black arrows.

5.7 BIAS CIRCUIT



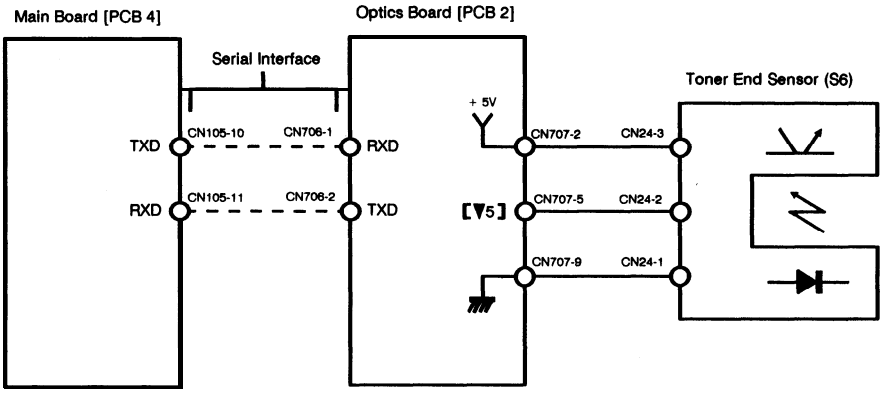
The above diagram shows the bias control circuit in block form

The dc power supply board [PCB6] supplies +24 volts to CN18-1 of the transfer/bias power pack [P2]. The de/de converter changes this input to the high voltage used for development bias.

The main board [PCB4] outputs the bias trigger from CN107-8. The bias trigger is an active LOW. The development bias is applied whenever the master belt is rotating.

The bias for black development units is -225 volts. Color development units have a zener diode that drops the bias to -180 volts.

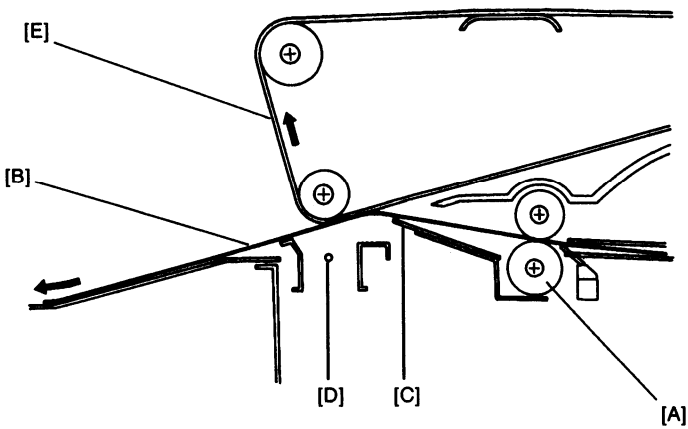
5.8 TONER END SENSOR CIRCUIT



The optics CPU monitors the toner end sensor to determine whether a toner end condition exists. If CN707-5 drops to LOW three or more times during a 5-second period, the optics CPU signals the main CPU over the serial interface. The main CPU immediately stops the copier and lights the Add Toner indicator. To resume copying a new toner cartridge must be added. After the start key is pressed, the balance of the copy run be be completed.

6. TRANSFER AND SEPARATION

6.1 OVERVIEW



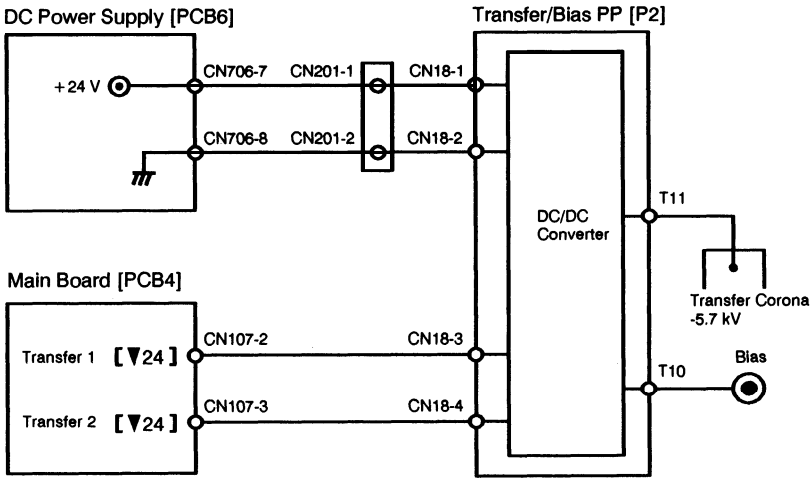
Front View

The registration rollers [A] feed the copy paper [B] through the transfer entrance guides [C] to the transfer section. A high negative voltage is applied to the transfer corona wire [D], and as a result the corona wire generates a cloud of negative ions. These negative ions are applied to the copy paper, and the negative charge attracts the positively charged toner away from the master belt [E] and onto the paper.

If damp paper is used, it will reduce the efficiency of transfer. The electrical resistance of damp paper is lower than that of dry paper. So, part of the transfer corona charge may leak to the machine ground or across the paper to the master. This will reduce the effectiveness of the transfer process which results in a light or patchy image.

There is no separation mechanism. The master turns at a sharp angle (approximately 90 degrees) just after the transfer point. Due to the paper's stiffness, it cannot make this sharp turn and separates without any assistance.

6.2 TRANSFER CORONA CIRCUIT



The above diagram shows the transfer corona control circuit in block form. The dc power supply board [PCB6] supplies +24 volts to CN18-1 of the transfer/bias power pack [P2]. The de/de converter changes this input to the high voltage used by the transfer corona.

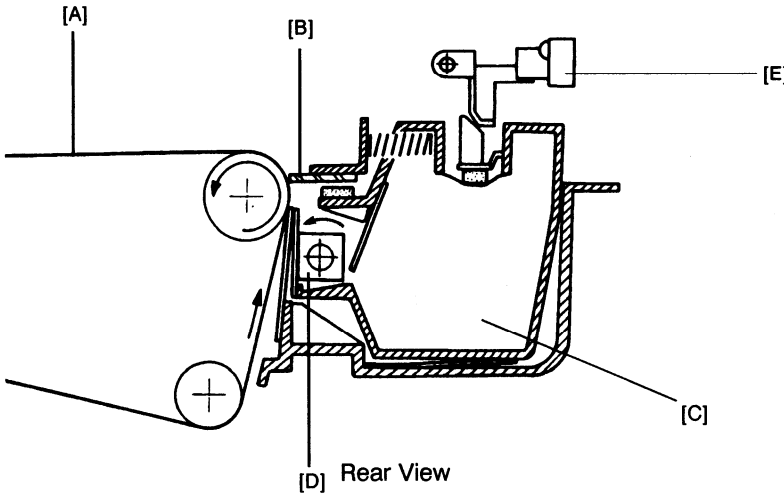
The main board [PCB4] sends the transfer 1 trigger signal (active LOW) from CN107-2. This signal is applied when the developed image on the master comes close to the transfer section (about 3.5 seconds after scanning starts).

The transfer 2 signal normally is not used. This signal can be activated by turning on DIP101-9 on the main board. When this switch is turned on, the CPU uses both CN107-2 and -12 to trigger the transfer corona. The corona current, which is normally -95 µA, current becomes -80 µA. The lower corona current may be useful if image transfer is insufficient when copying on thick paper.

When a color development unit is installed, the transfer corona current is -80 µA no matter what the setting of DPS101-9 is. The power pack [P2] senses the change from -225 V to -180 V at T10 when the bias is applied to a color development unit and automatically shifts the transfer corona output to -80 µA.

7. CLEANING

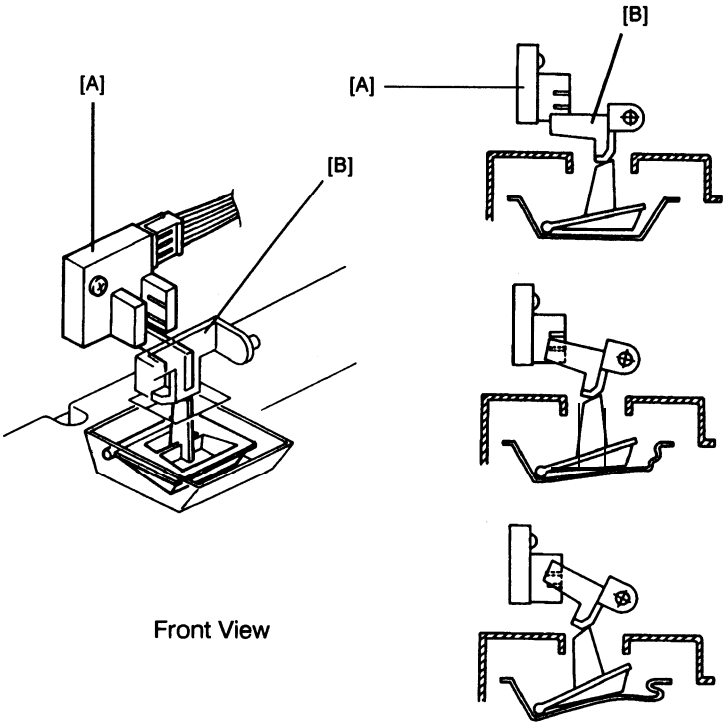
7.1 OVERVIEW



After image transfer, the master [A] moves past the cleaning section. There, the cleaning blade [B] wipes off any toner remaining on the master surface. The toner that drops off the master surface is then moved into the used toner tank [C] by the toner sweeping bar [D].

The toner overflow sensor [E] detects when the used toner tank is full.

7.2 TONER OVERFLOW DETECTION



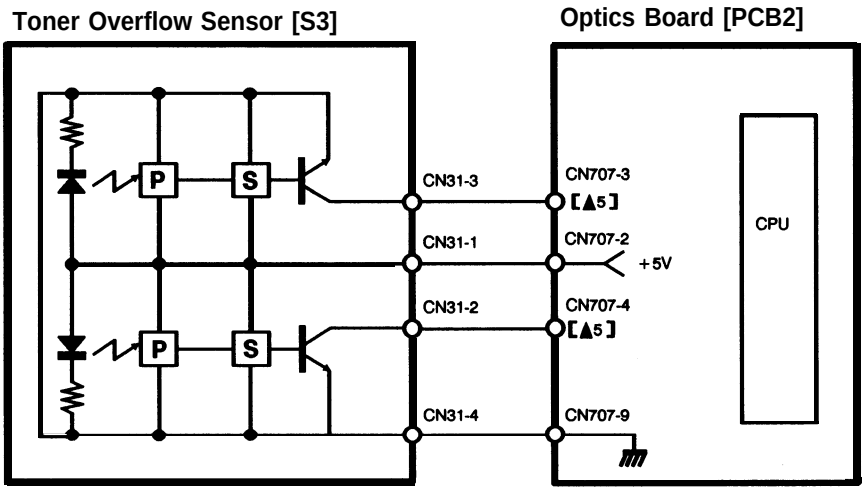
Front View

The toner overflow sensor [A] consists of two photointerrupters. The lower photointerrupter is for the near overflow detection and the upper is for overflow detection.

As used toner piles up, the sensor actuator [B] is raised. The actuator actuates the lower photointerrupter first, and after more toner is added, it actuates the upper photointerrupter.

The CPU monitors the toner overflow sensor during the stand-by condition. When the near overflow is detected, the CPU starts blinking the Replace Toner Collection Unit indicator. When the overflow is detected, the Replace Toner Collection Unit indicator changes from a blinking to a continuously lit condition, inhibiting further copying.

7.3 TONER OVERFLOW DETECTION CIRCUIT



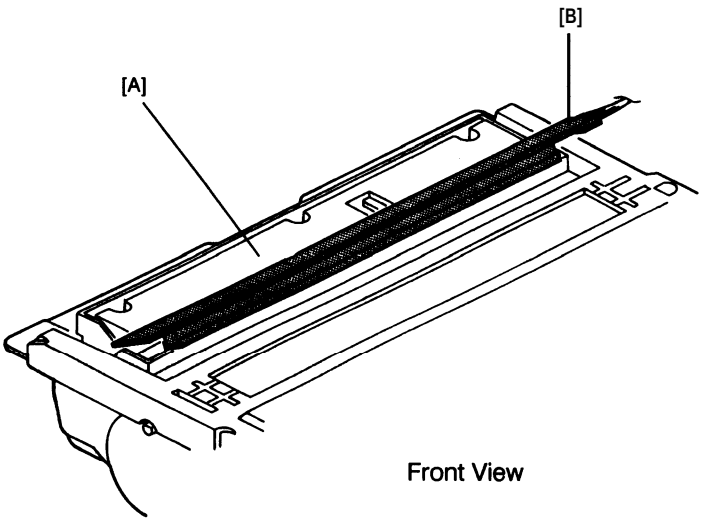
P: Photoreceiver
S: Schmitt Trigger Circuit

The optics CPU applies 5 volts to CN31 -3 and CN31 -2 to monitor the near overflow and overflow conditions. When one of the photointerrupters is not blocked, its transistor turns on. This results in LOW (0 volt) at its connector. When a photointerrupter is blocked by the sensor actuator, the transistor turns off. This results in HIGH (5 volts) at the signal line connector.

When the optics CPU detects a HIGH input at either CN707-3 or CN707-4, it notifies the main board via the serial interface. If CN707-3 is HIGH, the Replace Toner Collection Unit indicator starts blinking (near overflow). This is designed to alert the operator of the condition. When HIGH is detected at CN707-4, the Replace Toner Collection Unit indicator stops blinking and stays continuously lit (overflow condition). At this time copying is prohibited until the toner collection unit is replaced.

8. QUENCHING

8.1 OVERVIEW

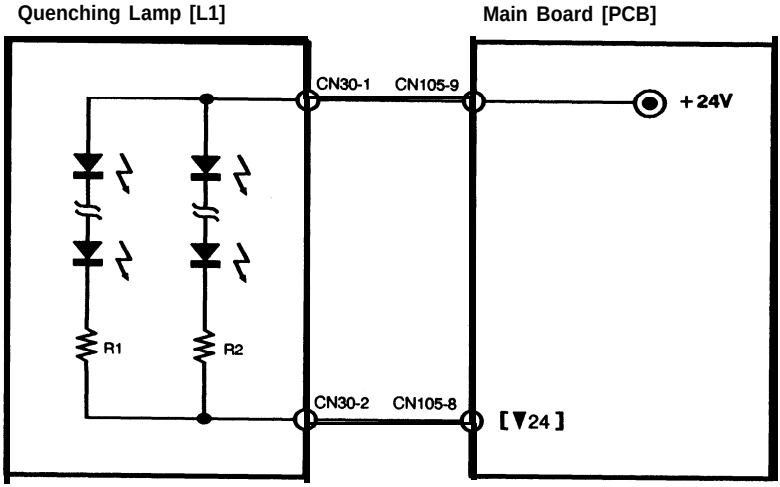


Front View

After the master belt moves past the cleaning unit [A], the quenching lamp [B] illuminates the master surface. This illumination is to neutralize any latent image charge from the previous copy cycle and prepare the master surface for the next copy cycle.

This machine uses a row of LEDs as a source of illumination for master quenching.

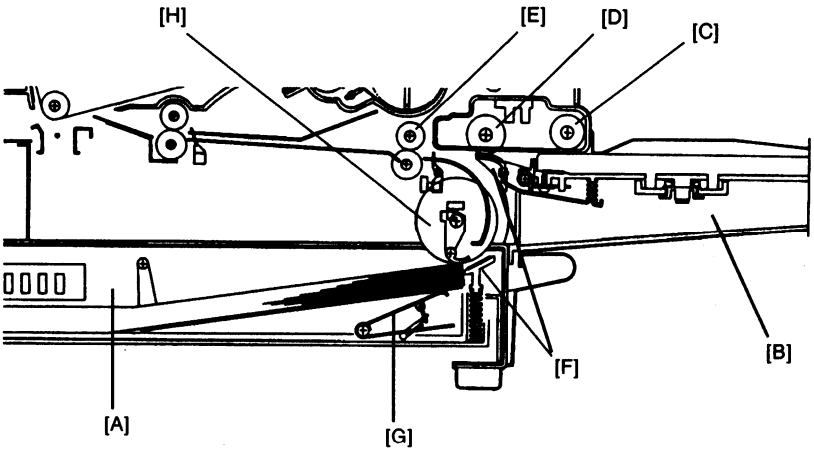
8.2 QUENCHING LAMP CIRCUIT



To light the quenching lamp, the CPU drops CN105-8 to LOW. This occurs at the same time that the master belt starts rotating. CN105-8 goes HIGH, to turn off the quenching lamp, at the same time that the master belt stops rotating.

9. PAPER FEED AND REGISTRATION

9.1 OVERVIEW



Front View

Paper feeds automatically either from the paper cassette [A] or the paper tray [B].

Paper Tray Feed

The capacity of the paper tray is 100 sheets (depending on paper thickness). The pick-up roller [C] drops down onto the top sheet of paper. Rotation of the pick-up roller and the tray feed roller [D] drives the top sheet of paper to the relay rollers [E]. The friction pad [F] prevents the bottom sheets of paper from feeding, which allows only the top sheet of paper to be fed.

Cassette Feed

The capacity of the cassette is 250 sheets (depending on paper thickness). The cassette lift arm [G] raises the paper stack up to the cassette feed roller [H] when the cassette tray is slid into position. Rotation of the cassette feed roller drives the top sheet of paper to the relay rollers.

The relay rollers take over the paper drive after the cassette feed roller or the tray feed roller have advanced paper to this point.

9.2 CASSETTE FEED

9.2.1 Paper Feed System

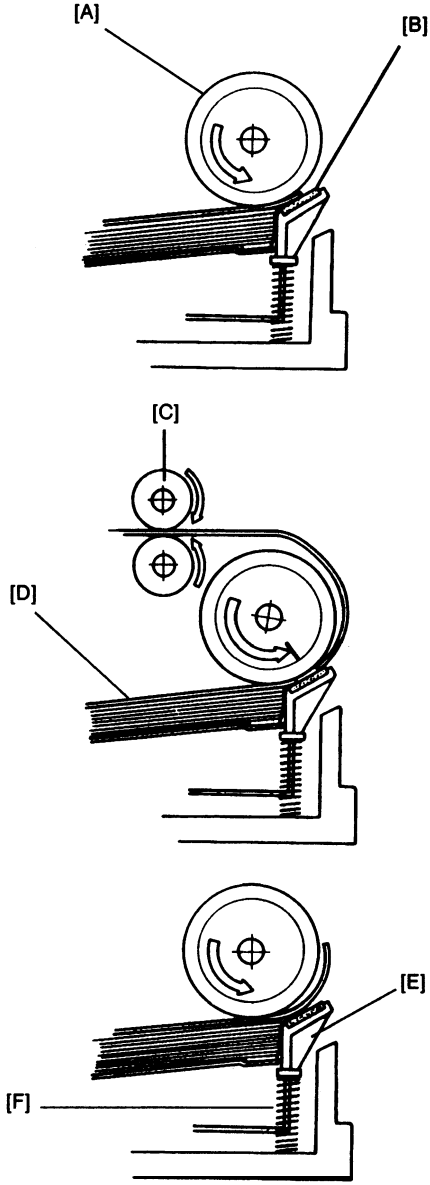
The cassette uses a feed roller and friction pad paper feed system.

When the feed roller [A] starts turning, it forces a single sheet of paper across the friction pad [B]. The relay roller [C] takes over paper feed when the paper reaches it.

When the trailing edge clears the leading edge of the paper stack [D], the feed roller catches on the next sheet and starts moving it forward. The feed roller stops turning when the trailing edge of the first sheet leaves the feed roller. The leading edge of the next sheet is then held ready for feeding between the friction pad and feed roller.

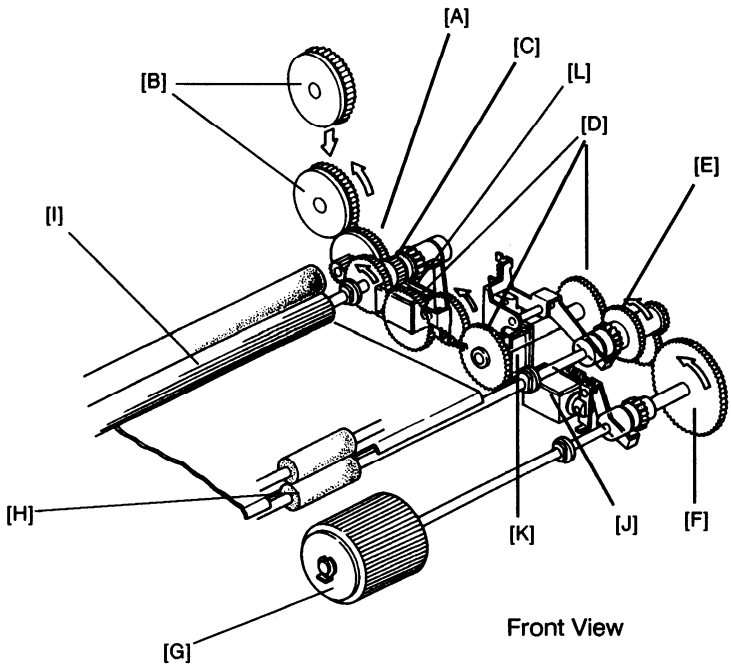
Sometimes sheets of paper tend to stick together (due to, for example, static electricity, poorly cut edges, etc.). When this happens, two sheets may feed between the feed roller and friction pad. However, the coefficient of friction between the friction pad and lower sheet is much greater than that between the two sheets of paper. So, the top sheet slips through while the lower sheet is held by the pad.

The friction pad holder [E] is mounted on one end of the swivel plate with a swivel screw; so, it automatically applies even pressure against the feed roller and the copy paper. The pressure is provided by the pad pressure spring [F] underneath the swivel plate. When the release lever is lowered the pad pressure is released.



Front View

9.2.2 Cassette Feed Drive Mechanism

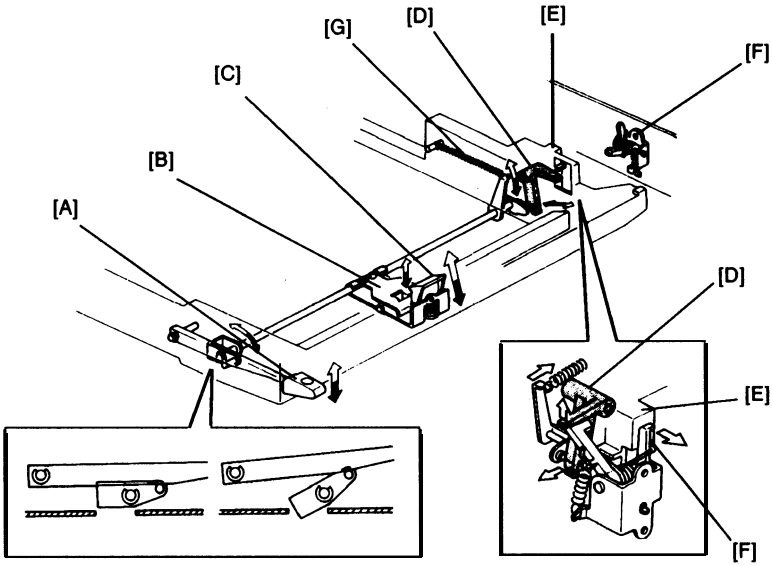


The main motor transmits rotation to the engage gear [A] through the drive relay gear [B] mounted on the upper clamshell. Drive is transmitted to the registration roller gear [C], through a series of idle gears [D], to the relay roller gear [E], then finally to the paper feed roller gear [F] (through an idle gear).

The cassette feed roller [G], the lower relay roller [H], and the lower registration roller [I] have clutches on their shafts and their rotation is controlled by solenoids.

The cassette feed roller turns when the cassette feed solenoid [J] is on; whereas, the relay rollers rotate when the relay solenoid [K] is not energized. The registration rollers, however, rotate when the registration solenoid [L] is on.

9.2.3 Cassette Tray Mechanism

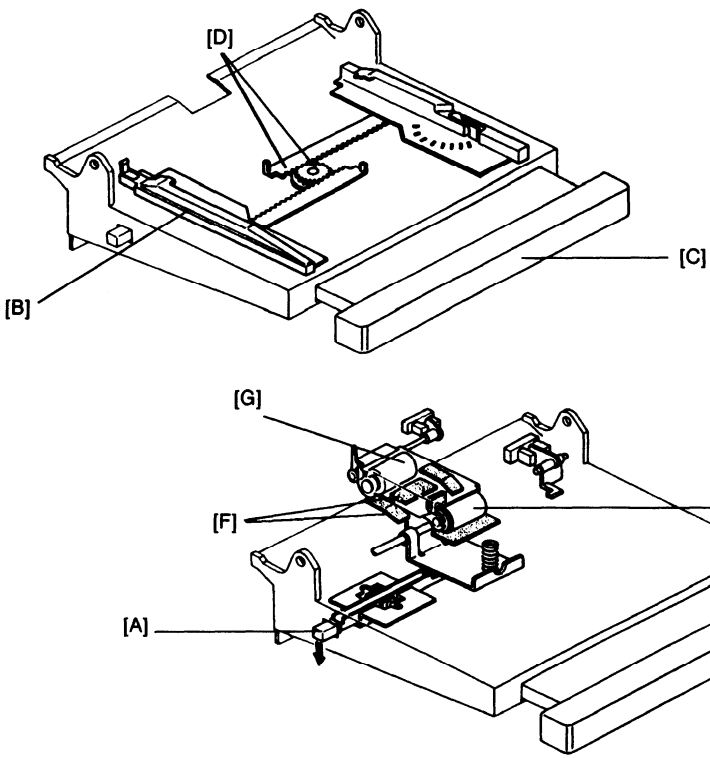


To slide the cassette tray out of the copier. the release lever [A] must be pushed down until it locks (black arrow direction). When the release lever is lowered, the cassette lift arm [B] and the friction pad [C] are also lowered (black arrow direction). This separates the paper stack from the feed roller. When the release lever is fully lowered, the release lever is locked by the lock lever [D] at the rear side of the cassette tray.

When the cassette tray is re-inserted into the copier, the release lip [E] on the rear side of the cassette tray contacts the unlock lever [F]. As the cassette is further inserted, the unlock lever releases the lock lever and the cassette lift arm raises the paper stack to the feed position. As paper volume decreases through usage, the cassette arm spring [G] keeps the paper stack at the proper feed position.

9.3 PAPER TRAY FEED

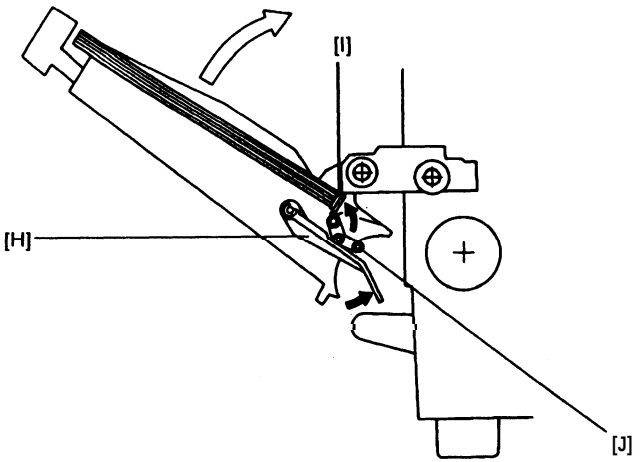
9.3.1 Paper Tray Mechanism



Up to 100 sheets of standard copy paper can be loaded on the paper tray. Paper of unusual size or weight can be fed from this tray. Also, the OHP transparency lever [A] allows copying on OHP transparencies by reducing friction pad pressure.

Side fences [B] and a rear fence [C] have been provided for easy alignment of different sizes of paper on the paper tray. The fences indicate the paper size to the CPU by actuating paper width and length sensors. The side fences are connected by a rack and pinion system [D]. This keeps the paper centered and helps to prevent skew.

The paper tray feed system separates the sheets of paper by using the pick-up roller [E] and the pads [F] on the paper tray. The pick-up roller and tray feed roller [G] carry the separated copy paper to the relay rollers.



Rear View

When the paper tray is lifted, the paper tray sensor deactivates and lights the Wait indicator and Lift Paper Tray indicator. This disables the copier. At the same time, the center fence lever [H] forces the center fence [I] to swing up by pushing the center fence arm [J]. This prevents sheets of paper from slipping off the tray when in the raised position.

9.3.2 Paper Tray Feed Rollers

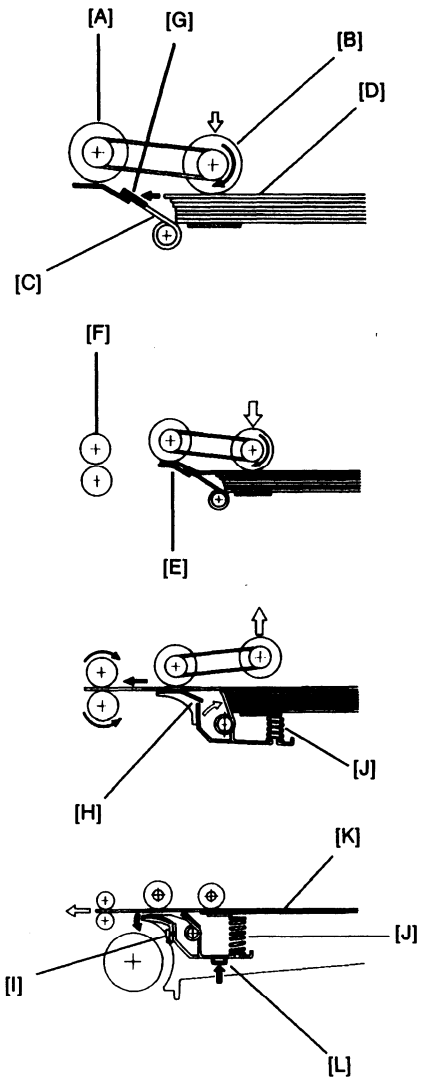
When the Start key is pressed, the tray feed roller [A] and the pick-up roller [B] start turning. At the same time, the center fence [C] drops down to allow the paper [D] to pass, and the pick-up roller drops onto the paper. The pick-up roller feeds the top sheet to the tray feed roller and tray friction pad [E]. The tray feed roller then feeds the paper to the relay rollers [F].

The tray friction pad, the side pads, and the center fence pad [G] prevent any sheets except the top one from being fed. This is because the resistive friction of these pads is much greater than the friction between the sheets of paper. So, only the top sheet can pass.

After the pick-up roller has completed 1.5 turns and the sheet of paper has reached the tray feed roller, the pick-up roller and the center fence rise up. At this time, the center fence aligns the sheets of paper remaining in the tray.

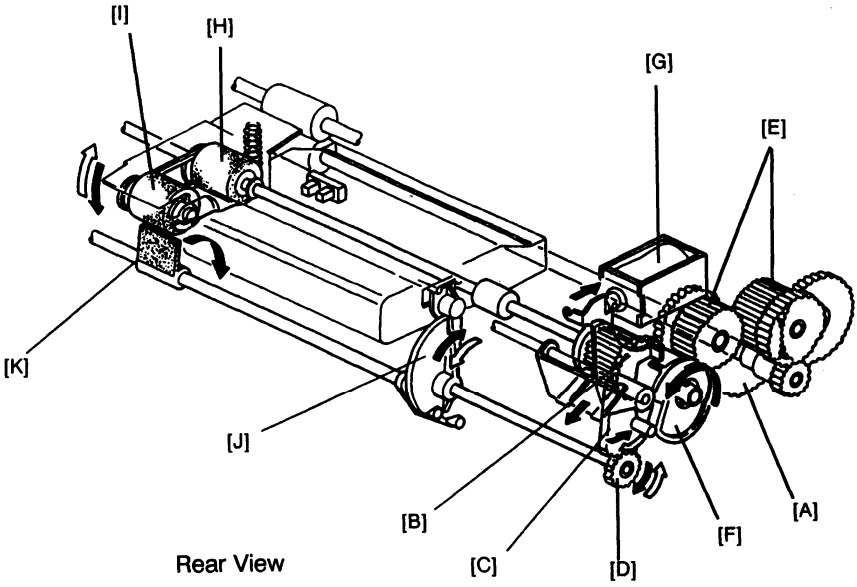
The friction pad holder [H] is mounted with a swivel screw [I]; so, it applies even pressure against the tray feed roller and the copy paper. The tray feed pressure is provided by the pad pressure spring [J].

The friction between the tray feed roller and the tray friction pad is too strong for copying on OHP transparencies [K]. For this reason, only one OHP should be placed on the paper tray at a time and the OHP transparency lever must be pushed and held down until the trailing edge enters the machine.



Front View

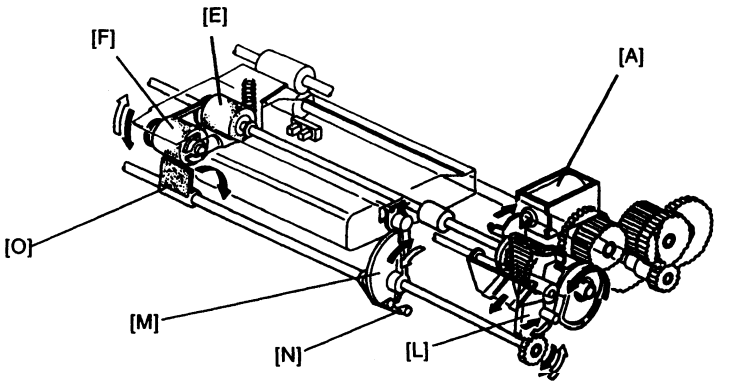
9.3.3 Tray Feed Drive Mechanism



The above illustration shows the drive mechanism of the paper feed tray. Main motor rotation is transmitted to the relay roller gear [A] through a series of idle gears. (See the drive layout.) The rotation of the relay roller gear is transmitted to the tray feed roller gear [B], the sector gear [C], and the center fence gear [D] through two idle gears [E] and the pick-up clutch cam [F].

There are two clutches on the tray feed roller shaft which are controlled by the tray feed solenoid [G]. Thus, the tray feed solenoid controls the rotation of the tray feed roller [H] and the pick-up roller [I]. Also, through the pick-up clutch cam, sector gear, and pick-up cam [J] it controls the pick-up roller up/down movement and the center fence [K] movement.

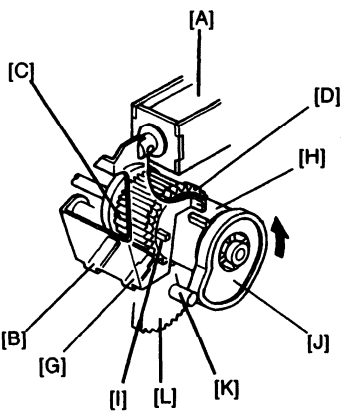
9.3.4 Pick-up Clutch Mechanism

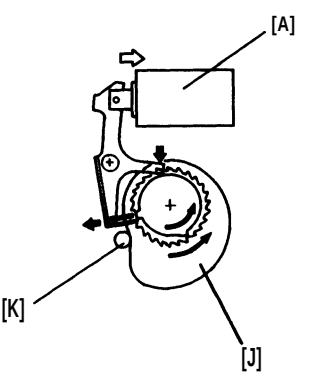


In the paper tray feed mode, when the Start key is pressed, the tray feed gear starts rotating and the tray feed solenoid [A] is energized. As the tray feed solenoid is energized, the tray feed pawl [B] is moved away from the tray feed clutch [C]. The tray feed gear [D] rotation is then transmitted to the tray feed roller [E] and the pick-up roller [F].

Also, when the tray feed solenoid is energized, the pick-up pawl [G] is moved away from the pick-up clutch [H]; thus, the pick-up projection [I] is released. Then, the tray feed gear rotation is transmitted to the pick-up clutch cam [J].

When the pick-up clutch cam rotates counterclockwise, the sector gear pin [K] drops down off the lobe of the pick-up clutch cam. Then, the sector gear [L] rotates counter-clockwise and the pick-up cam [M] rotates clockwise. This forces the pick-up roller to drop down. At this time the pick-up cam pushes against the center fence pin [N] and the center fence [O] swings down.



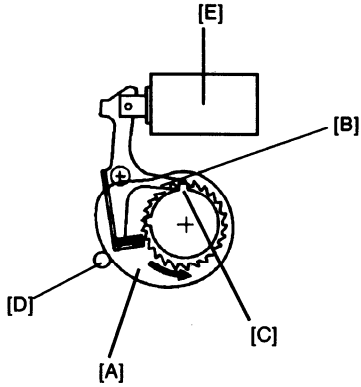


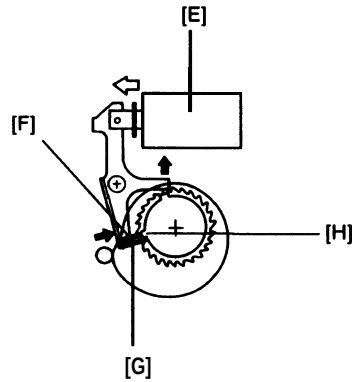
Rear View

After the pick-up clutch cam [A] rotates 180 degrees counterclockwise the sector gear starts rotating clockwise due to the shape of the pick-up clutch cam. This causes the pick-up roller to rise and the center fence to swing up.

When the pick-up clutch cam has rotated about 350 degrees, it stops rotating because the cam stopper pawl [B] engages with the cam stopping projection [C]. At this time, the sector gear pin [D] is on the lobe of the pick-up clutch cam; so, both the pick-up roller and the center fence are raised.

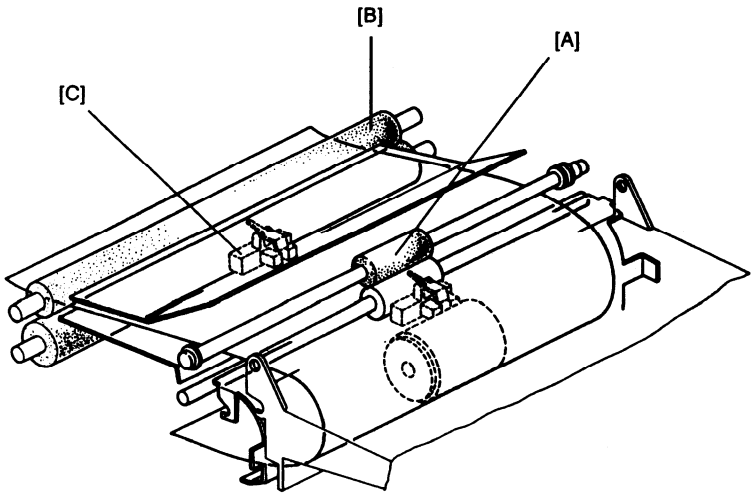
The tray feed solenoid [E] turns off 22 pulses (250.4 ms) after the feed sensor is activated. Then, the tray-feed pawl [F] engages with the tray-feed clutch and the pick-up pawl [G] engages with the pick-up projection [H]. At this time, the copy paper has already reached the relay roller which- takes over paper transportation.





Rear View

9.4 RELAY FEED AND REGISTRATION



Front View

The relay rollers [A] take over paper drive from the cassette paper feed roller or tray paper feed roller and drive the paper to the registration rollers [B]. The registration rollers stop rotating before the paper contacts them, but the relay rollers continue rotating until the paper has contacted the registration rollers and buckled the paper to correct skew.

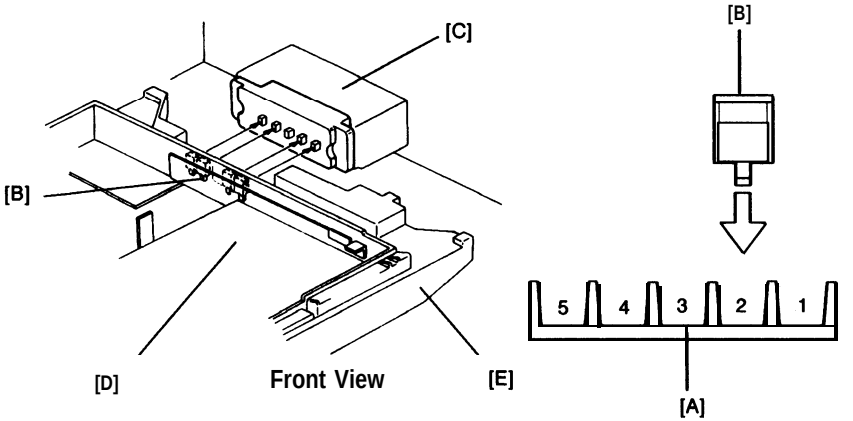
By monitoring the registration sensor [C], the CPU controls the relay roller stop timing. The relay roller solenoid turns on 9 pulses (102 ms) after the leading edge of the paper has passed the registration sensor. When the relay roller solenoid turns on, the relay rollers stop rotating.

When the registration solenoid turns on, the registration rollers rotate. The CPU turns on the registration solenoid approximately 2.2 seconds after the scanner starts moving forward (exact timing depends on DIP switch setting).

The relay roller solenoid turns off at the same time that the registration solenoid turns on. So, both the relay rollers and the registration rollers start rotating at the same time, and both rollers feed the paper to the master for image transfer.

9.5 PAPER SIZE DETECTION

9.5.1 Cassette Tray



[D] : Paper Stack
[E] : Cassette Tray

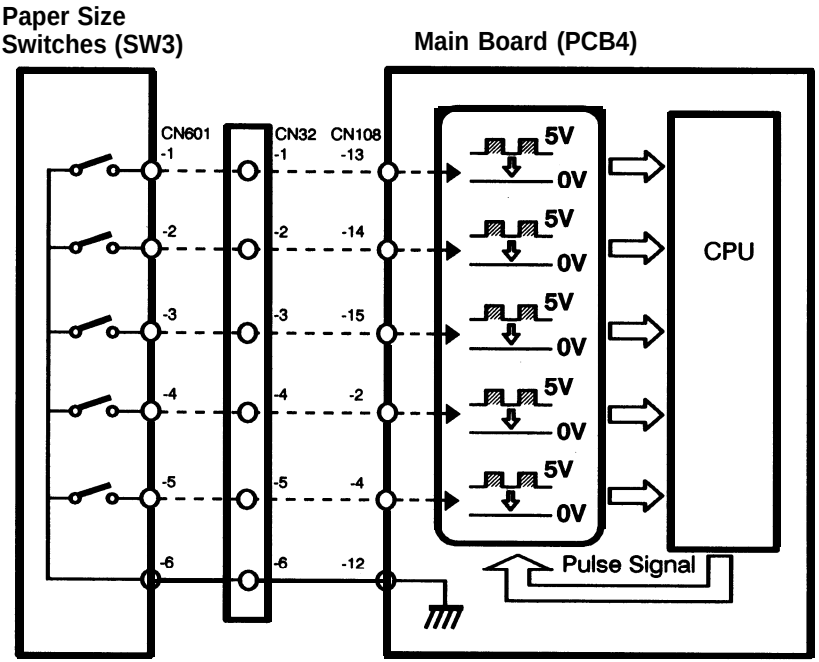
This copier uses a set of five push switches (N/O) to monitor the size of the paper in the cassette.

The rear side of the cassette has five slots [A] for paper size actuators. Each actuator [B] when inserted closes one of the five paper size switches [C]. The CPU monitors these five switches to determine the size of the paper in the cassette. The table to the right shows which actuators should be installed for each paper size. This same table is also embossed on the bottom of the cassette for quick reference.

Paper Size	Switch No.				
	5	4	3	2	1
No cassette	0	0	0	0	0
5-1/2" x 8-1/2" (L)	0	0	0	1	1
8" x 10"	0	0	1	0	0
8" x 10-1/2"	0	0	1	0	1
8" x 13"	0	0	1	1	0
8-1/4" x 13" (14")	0	0	1	1	1
8-1/2" x 11" (L)	0	1	0	0	1
8-1/2" x 13"	0	1	0	1	0
8-1/2" x 14"	0	1	0	1	1
10" x 14"	0	1	1	0	0
10" x 15"	0	1	1	0	1
8-1/2" x 11"	0	1	1	1	0
11" x 17"	0	1	1	1	1
A6 (L, Postcard)	1	0	0	1	0
B6 (L)	1	0	1	0	0
A5 (L)	1	0	1	1	0
A5	1	0	1	1	1
B5 (L)	1	1	0	0	0
B5	1	1	0	0	1
A4 (L)	1	1	0	1	0
A4	1	1	0	1	1
B4	1	1	1	0	0
A3	1	1	1	1	0

1 : Actuator
0 : No actuator
L : Lengthwise feed

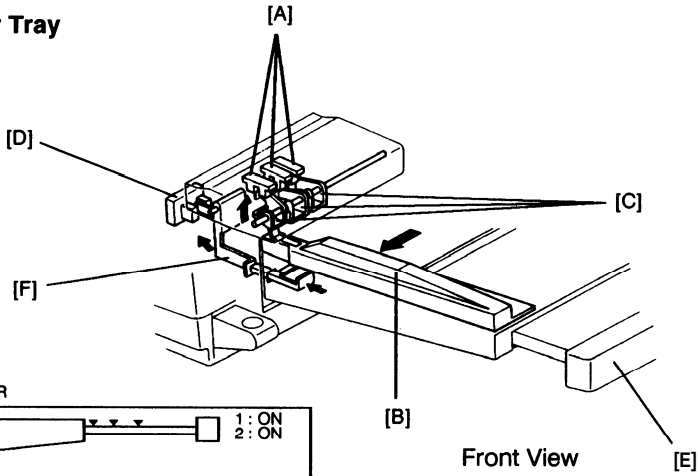
9.5.2 Cassette Paper Size Detection Circuit

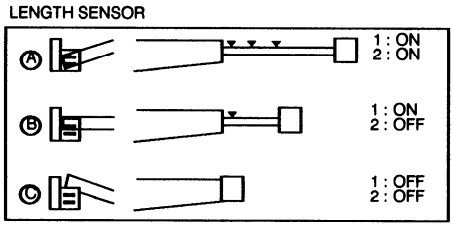


The CPU sends a 5-volt pulse to each of the five paper size switches.

When a paper size actuator closes one of the paper size switches, the 5-volt pulse drops to 0 volts. The CPU determines the paper size by monitoring the five signal lines.

9.5.3 Paper Tray





This copier has four sensors to monitor the size of the paper in the paper tray. Three of these sensors are paper width sensors [A]. When the side fence is adjusted according to paper width, the lifter on the side fence [B] pushes the appropriate actuator [C] into its sensor.

The fourth sensor is the paper length sensor [D], which is situated behind the paper turn guide. This sensor consists of two photosensors. When the rear fence [E] is brought into contact with the paper stack, the rear fence actuator pushes against the length sensor interrupter [F] and actuates the length sensor.

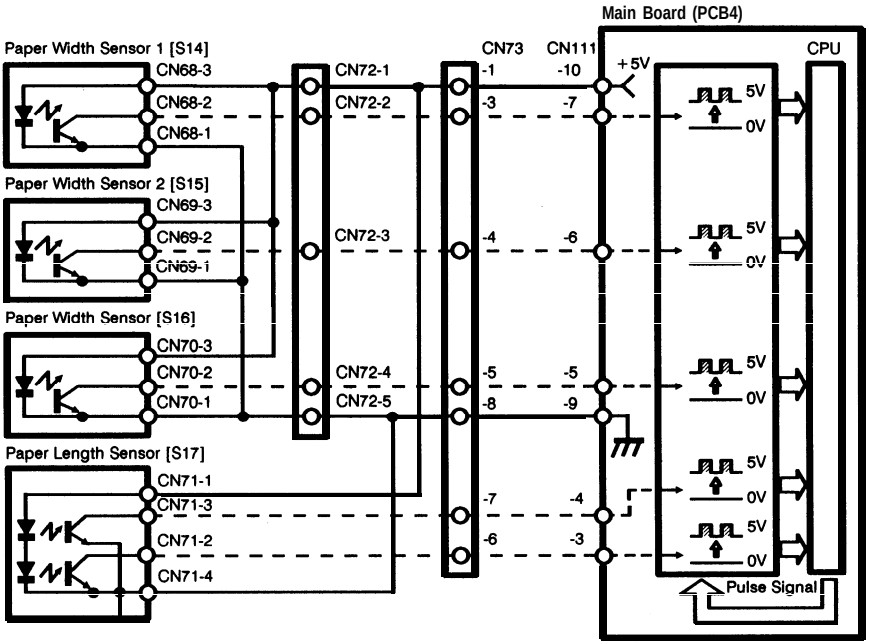
The table to the right shows which sensors are actuated according to the paper size.

Paper Size Table

Paper Size	Width Sensors			Length Sensor	
	1	2	3	1	2
F, 8-1/2" x 14"	1	0	0	1	1
A4 (L), 8-1/2" x 11" (L)	1	0	0	1	0
A5, 8-1/2" x 8-1/2"	1	0	0	0	0
B4, 11" x 17"	0	1	0	1	1
B4, 11" x 17"	1	1	0	1	1
A4, 8-1/2" x 11"	0	1	0	0	0
A4, 8-1/2" x 11"	1	1	0	0	0
A4, 8-1/2" x 11"	0	1	1	0	0
A4, 8-1/2" x 11"	0	0	1	0	0
A3, 11" x 17"	0	0	1	1	1
A3, 11" x 17"	0	1	1	1	1

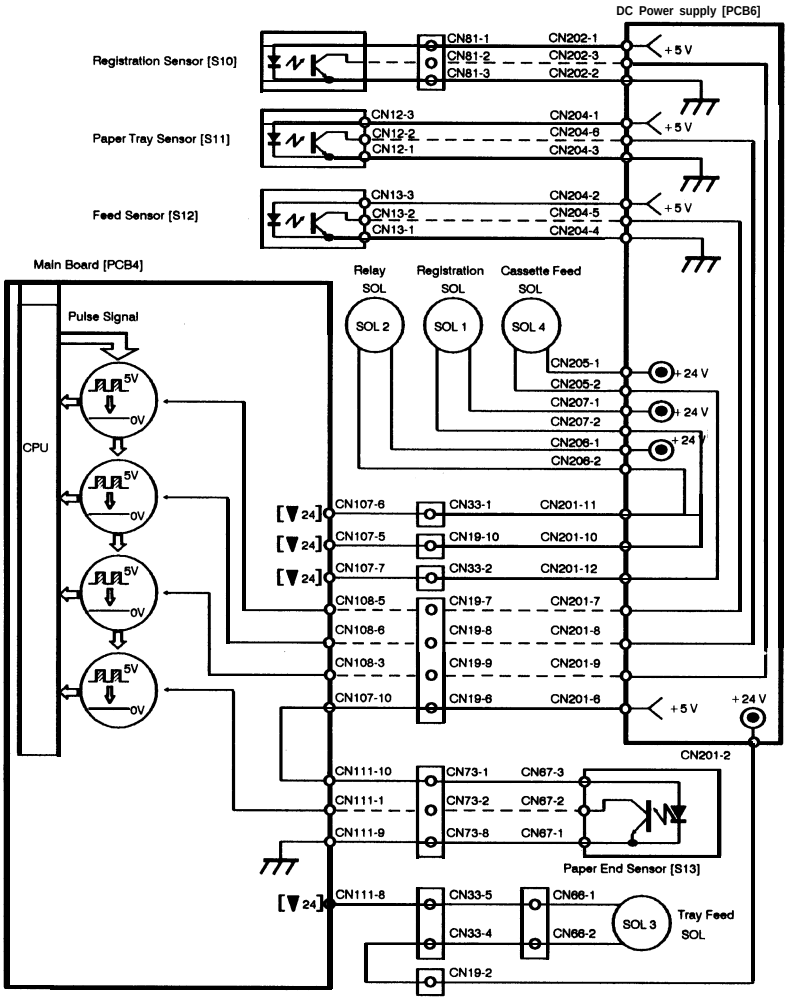
1 : Blocked 0 : Unblocked

9.5.4 Tray Paper Size Detection Circuit



The CPU sends 5-volt pulses to each of the paper size sensors. When the paper size sensors are actuated (blocked), the photosensors are interrupted; thus, the signal lines are no longer connected to ground via the photosensors and the 5-volt pulse is present at the respective main board connector. The CPU determines the paper size by monitoring the five signal lines.

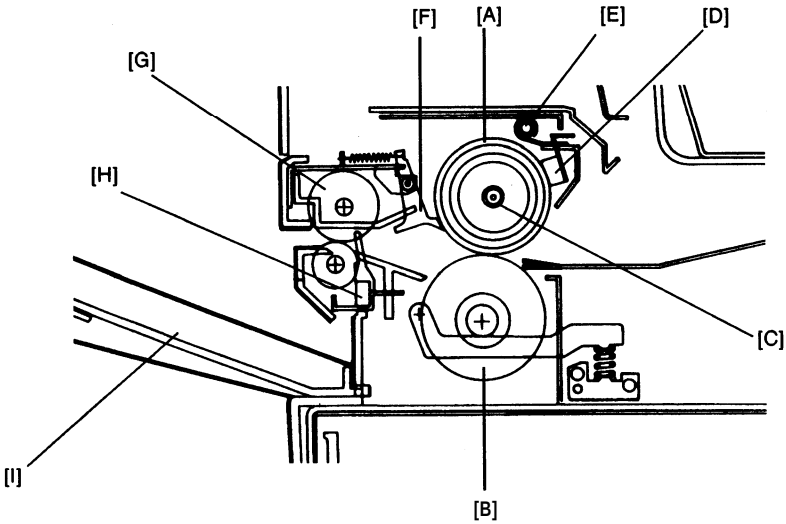
9.6 PAPER FEED CONTROL CIRCUIT



The dc power supply board supplies +24 volts to the solenoids and + 5 volts to the sensors for the paper feed system. The main board controls the functions of the components shown in the diagram above through the dc power supply board. To energize each of the solenoids, the CPU outputs LOW at the connected trigger line. For the paper feed, registration and paper end sensors, the CPU sends 5-volt pulses to each connector and monitors the returned signal. When the sensor is blocked, the 5-volt pulse can be read at the main board connector.

10. IMAGE FUSING

10.1 OVERVIEW



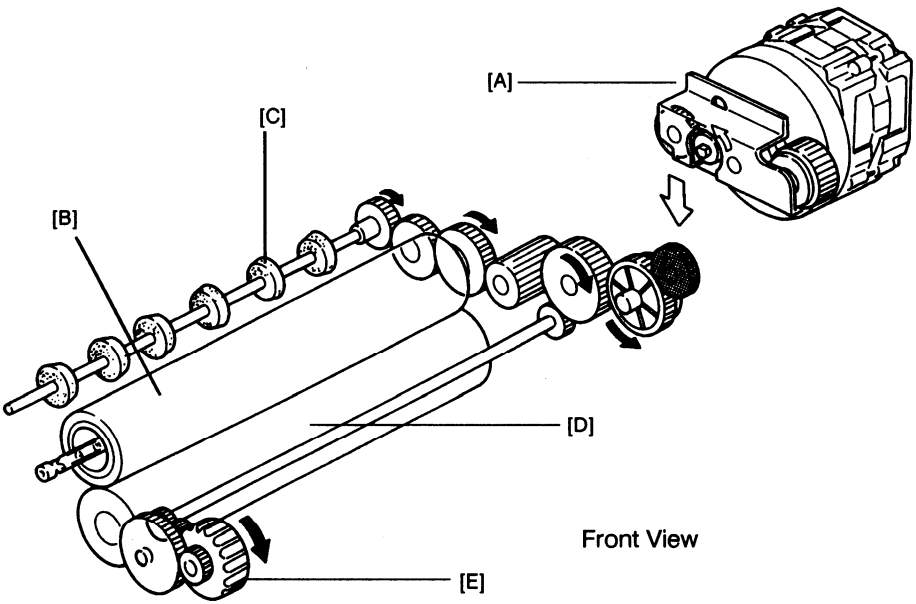
Front View

After the image is transferred, the copy paper enters the fusing unit. There the image is fused to the copy paper by the process of heat and pressure through the use of a hot roller [A] and pressure roller [B].

The fusing lamp [C] located inside the hot roller, is turned on and off to maintain the operating temperature of 185 degrees Celsius. The CPU monitors the hot roller surface temperature through a thermistor [D] which is in contact with the hot roller's surface. A thermofuse [E] protects the fusing unit from overheating.

The hot roller strippers [F] separate the copy paper from the hot roller and direct it to the exit rollers [G]. The exit sensor [H] monitors the travel of the copy paper through the fusing unit and acts as a jam detector while the exit rollers drive the copy paper to the copy tray [I].

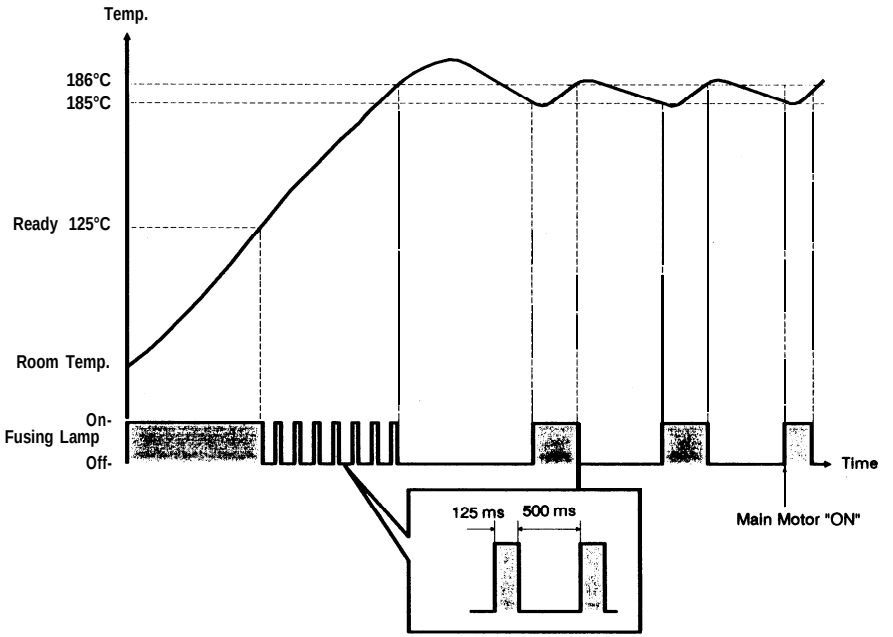
10.2 DRIVE MECHANISM



The main motor [A] drives the hot roller [B] and exit rollers [C] through a system of gears as shown above. The pressure roller [D] is friction driven by the rotation of the hot roller.

Manually rotating the paper reverse knob [E] clockwise causes the hot roller to rotate. This allows misfed paper to be removed from the fusing unit.

10.3 FUSING CONTROL



When the main switch is turned on, the CPU sends the enable signal to the fusing control circuit. The fusing control circuit then applies full power to the fusing lamp. Full power is applied until the fusing thermistor senses the ready temperature (125 degrees C). This should take less than 40 seconds.

During warm-up, the thermistor's temperature lags behind the hot roller's temperature. As a result, when the thermistor senses the ready temperature, the hot roller is already at or near the operating temperature. At that time the Ready indicator turns on.

After the thermistor senses 125 degrees C, the enable signal changes to a switching signal. The fusing lamp switches on 200 ms and then off 500 ms. This decreases the rate of heat application and prevents excessive overshoot. (Maximum permitted overshoot is about 10 degrees C, giving a total of 195 degrees C.) The CPU turns off the enable signal when the thermistor senses 186 degrees C.

After that, the enable signal is turned on constantly when the thermistor detects a temperature less than 185 degrees, and is turned off when the thermistor detects 186 degrees C.

To summarize, the CPU controls the fusing lamp in the following ways:

(1) Up to 125 degrees C: The fusing lamp stays continuously on.

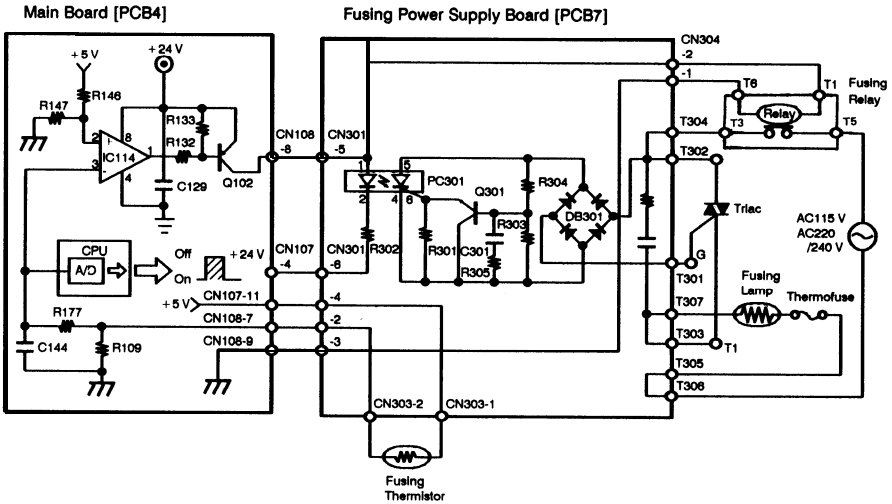
(2) 125 to 186 degrees C: The fusing lamp switches on and off.

(3) Above 186 degrees C: The fusing lamp stays off.

(4) After warm-up period: When 185 degrees C is detected, the fusing lamp turns on and stays on continuously, until the temperature reaches 186 degrees C.

The exposure lamp is a halogen lamp (300 W), which consumes more power than a fluorescent lamp. So, if the fusing lamp (960 W) is turned on or off when the exposure lamp is on, the power supplied to the exposure lamp will fluctuate, possibly degrading the copy image. To prevent this, the fusing lamp does not switch during scanning; it stays either on or off.

10.4 FUSING LAMP CIRCUIT



Above is a schematic of the fusing lamp control circuit. The circuit has both ac and dc components, which are coupled through a photocoupler.

The following discussion centers on circuit operation from the view point of the signals that can be observed between the main board and the ac drive board.

- Fusing Lamp On/Off -

To turn on the fusing lamp, the CPU supplies a LOW at CN107-4. This supplies ac power to the fusing lamp. This LOW is the enable signal discussed in the previous section. The CPU decides whether to apply a continuous LOW or a continuous HIGH (lamp OFF) based on the input from the thermistor at CN108-7. The voltage received at CN108-7 increases as the hot roller's temperature rises.

- Overheat Protection 1-

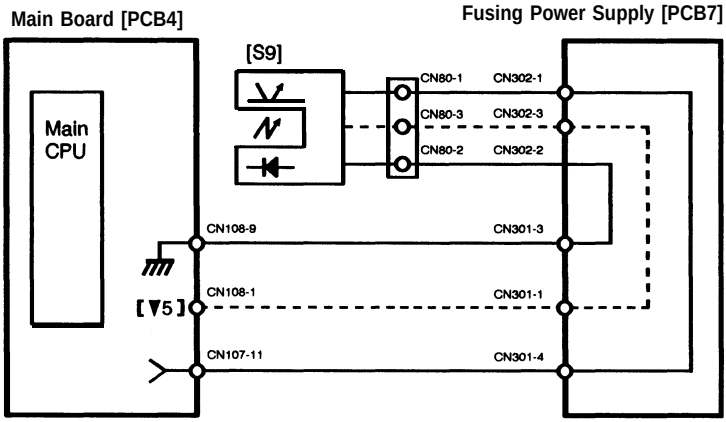
IC114 and Q102 form an overheat protection circuit. When the fusing unit is operating within the normal range, pin 1 of IC114 stays LOW, therefore, Q102 stays on, allowing PC301 to operate.

If the hot roller temperature reaches 210 degrees Celsius, the resistance of the thermistor becomes approximately 600 ohms. At that point, pin 1 of IC114 becomes HIGH, turning off Q-102 and preventing PC-301 from operating. At the same time, the fusing relay turns off, cutting ac power to the fusing lamp. (This protects against a triac short.)

- Overheat Protection 2-

In case the thermistor overheat protection fails, a thermofuse is installed in series with the fusing lamp. If the thermofuse temperature reaches 169 degrees Celsius, the thermofuse opens, removing power from the fusing lamp.

10.5 EXIT SENSOR CIRCUIT



The main CPU sends 5 volt pulses from CN108-1. In the standby condition, CN108-1 is LOW. However, when the exit sensor [S9] is actuated (blocked), the phototransistor turns off and the +5 volt pulse appears at CN108-1.

10.6 SERVICE CALL CONDITIONS

Service Code E52

Code E52 lights if the temperature detected by the thermistor does not reach 125 degrees C within 75 seconds after the main switch turns on.

Service Code E53

Code E53 lights if the temperature detected by the thermistor becomes higher than 270 degrees C.

Service Code E54

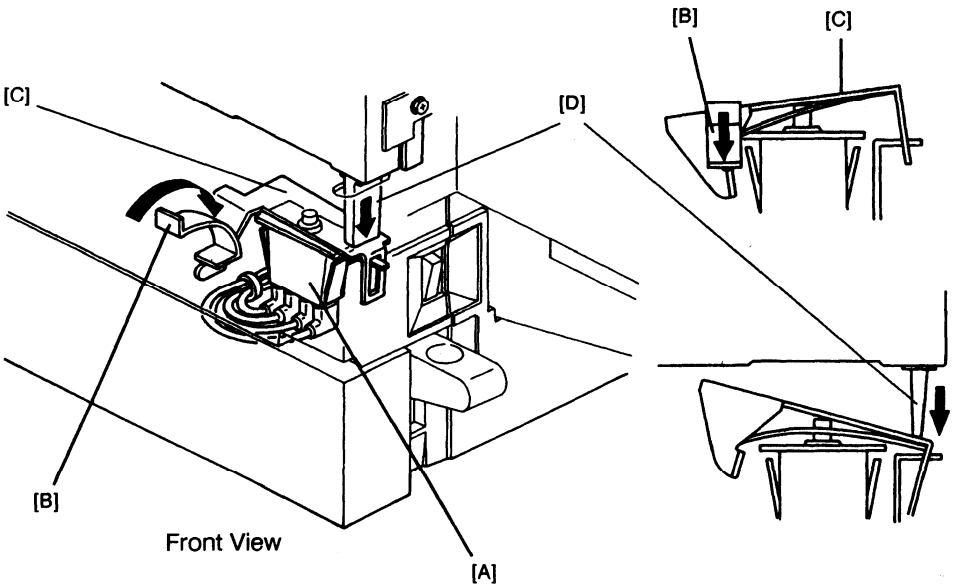
Code E54 lights if the temperature detected by the thermistor stays higher than 210 degrees C for over 145 seconds.

Service Code E55

Code E55 lights if the temperature detected by the thermistor does not reach 2 degrees C within 5 seconds after the main switch turns on.

11. OTHER COMPONENTS

11.1 SAFETY SWITCH

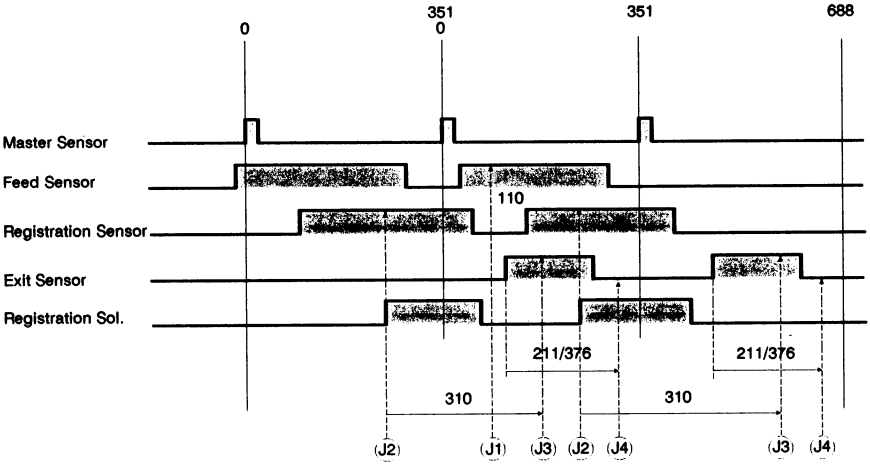


[A]: Safety switch
[B]: Front cover actuator
[C]: Safety switch lever
[D]: Upper clamshell actuator

The safety switch is installed in series with and prior to the main switch. When this switch turns off, it cuts ac power, turning off all electrical components in the copier.

The safety switch will turn on only if both the front cover and the upper clamshell are closed.

11.2 JAM SENSING



The feed sensor, the registration sensor, and the exit sensor monitor the movement of the copy through the paper path. If the CPU determines that a jam exists, the Check Paper Path indicator or Check Paper Tray indicator turns on. When the main switch is turned on, the CPU checks these three sensors for an initial jam. During the copy cycle, the CPU performs four kinds of jam checking:

J1 : **Checks whether the copy paper has actuated the feed sensor by the 110th pulse (1.25 s).**

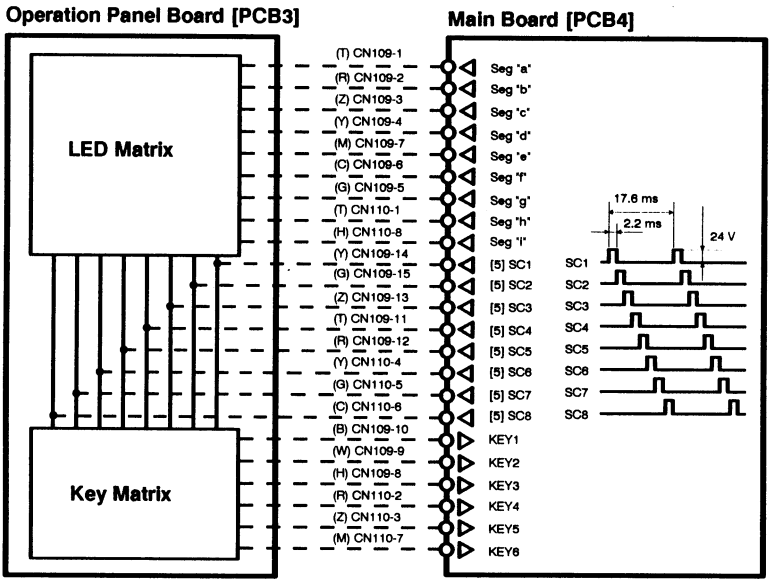
NOTE: **In the case of the first copy cycle, if the feed sensor has not been actuated by 200 pulses (2.28 s) after the Start key is pressed, the CPU shifts the copier to a jam condition.**

J2: **Checks whether the registration sensor is actuated after the registration solenoid is energized.**

J3: **Checks whether the exit sensor is actuated at 310 pulses (3.53 s) after the J2 check.**

J4: **Checks whether the copy paper has passed through the exit sensor 211 pulses (2.40s) after the exit sensor has been actuated.**

11.3 OPERATION PANEL CIRCUIT

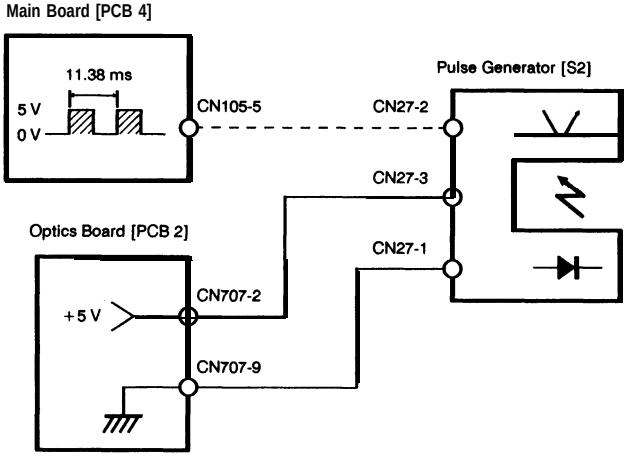


The above illustration shows the copier's operation panel circuit in block form.

The operation panel circuit is driven by eight scan pulse lines (SC1 to SC8). The copier uses LEDs for display elements. To light any particular LED, the CPU drops the appropriate segment line to O volts at the same time that the scan line connected to the LED is being energized.

The CPU monitors the KEY lines (KEY1 to KEY6) to determine if a key has been pressed. Each KEY line is used to monitor up to eight keys on the operation panel. A specific scan pulse appears at the appropriate KEY line when a key on the operation panel is pressed.

11.4 PULSE GENERATOR



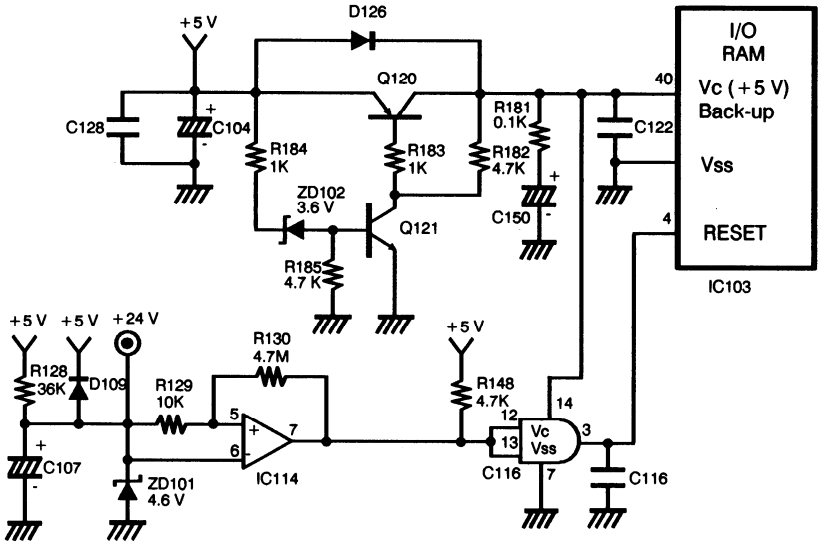
The copier's CPU controls the timing of all machine operations based on the number of pulses it receives from the pulse generator. Pulses are generated by the rotation of a perforated disk within a photocoupler. As the disk rotates, light from the LED activates the phototransistor each time a hole comes between them. The pulses arrive at the CPU at 11.38 ms intervals.

11.5 SERVICE CALL CONDITION

Service Code E61

The CPU monitors the pulse generator to detect malfunctions in the functional drive. If during the copy cycle, no pulse is received for 1.6 seconds, the CPU stops the machine and lights the self-diagnostic code E61.

11.6 DATA BACK-UP



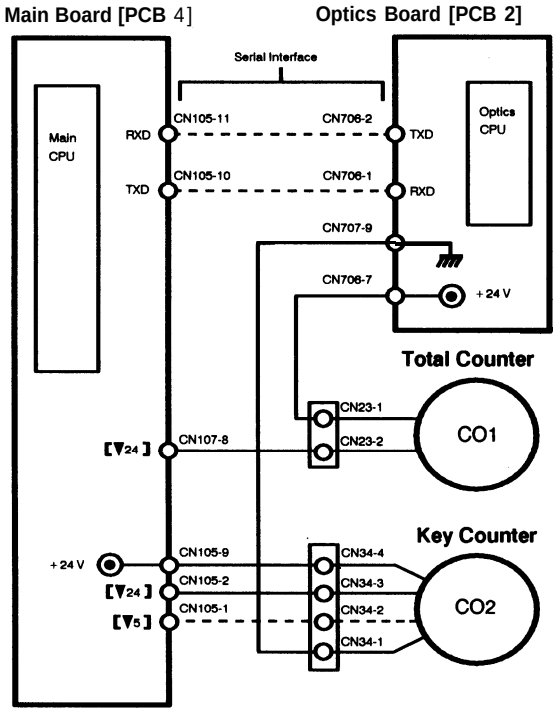
This copier has a RAM (256 byte) for holding data (copy count, reproduction ratio, image density, paper tray or cassette mode, book mode and interrupt mode).

The main board has a back-up circuit. In the case where a misfeed occurs in the copier and the front cover is opened to remove the misfed paper, the back-up system works to prevent any data from being lost due to power loss.

To hold data, pin 40 of IC103 (RAM) should be supplied with +5 volts and pin 4 of IC103 should be HIGH. During the copy run, C150 charges; therefore, even if no power is supplied to the main board, C150 supplies + 5 volts to IC103. The +5 volts also goes to IC116 and the output at pin 3 is held HIGH to prevent the charge on C150 from leaking to ground. Therefore, the data in IC103 is maintained. C150 can keep IC103 active for 15 to 20 minutes. If the machine remains off longer than that, the RAM data will be lost.

The back-up circuit also works under the following conditions:
1. Toner end
2. Replace Toner Collection Unit indicator lights
3. Paper end

11.7 COUNTER CIRCUITS



Total Counter:
The total counter is powered by +24 volts from CN706-7 of the optics board. The main CPU energizes the total counter by dropping CN107-8 to LOW. The total counter is energized when the Start key is pressed.

Key Counter:
The key counter is powered by +24 volts from CN105-9 of the main board. The main CPU monitors for the presence of a key counter at CN105-1. When a key counter is installed, CN105-1 is LOW; however, a + 5 volt pulse signal appears at CN105-1 if the key counter is removed.

The main CPU energizes the key counter by dropping CN105-2 to LOW.

SECTION 3

INSTALLATION

1. ENVIRONMENT

1. **Temperature Range:** **10°C to 30°C (50°F to 86°F)**
2. **Humidity Range:** 15% **to** 90% **RR**
3. **Ambient Illumination:** **Less than 1,500 lux (do not expose to direct sunlight).**
4. **Ventilation:** **Room air should turn over at least** 3 **times/hour.**
5. **Ambient Dust:** **Less than 0.15 mg/m^3 (4x 10^{-3} oz/yd^3)**
6. **Room Size:** **More than 10 m^3 (13.4 yd^3)**
7. **If the installation place is air-conditioned or heated, place the machine:**

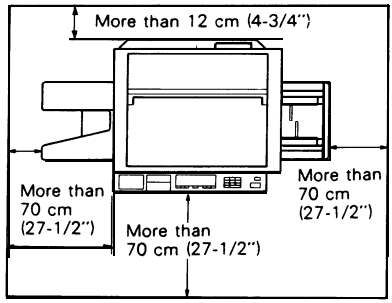
   a) Where it will not be subjected to sudden temperature changes from low to high, or vice versa.

   b) Where it will not be directly exposed to cool air from an air conditioner in the summer.

   c) Where it will not be directly exposed to reflected heat from a space heater in winter.

8. **Avoid placing the copier in an area filled with corrosive gas.**
9. **Avoid any area higher than 2,000 m (6,500 feet) above sea level.**
10. **Place the copier on a strong and level base.**
11. **Avoid any area where the copier may be subjected to frequent strong vibration.**

2. MINIMUM SPACE REQUIREMENTS



1. Front:	**70 cm** (27½")
2. Back :	**12 cm (4** 3/4")
3. Right :	**70 cm** (27½")
4. Left:	**70 cm (27½")**

3. POWER SOURCE

1. Input voltage level:

110 V/60 Hz : More than 12A
115 V/60 Hz : More than 12A
220 V/50 Hz: More than 6 A
220 V/60 Hz: More than 6 A
240 V/50 Hz : More than 6 A

2. Permissible voltage fluctuation: ± 10%

3. Permissible extension cord:

At least 300 V, 30A capacity and less than 5 m (5.5 yd) long.

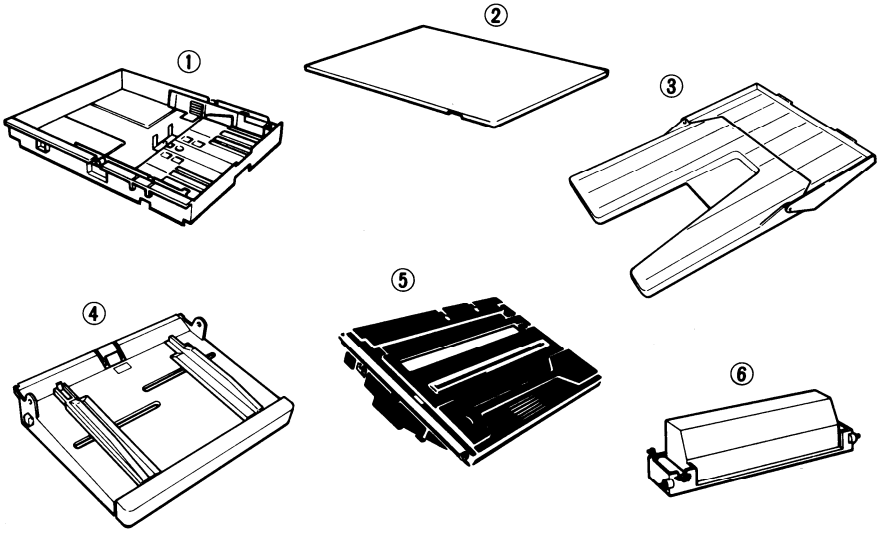
NOTE: **a) Be sure to ground the machine. (Do not connect the grounding wire to a gas pipe.)**

b) Make sure the plug is firmly inserted in the outlet.

c) Avoid multi-wiring.

d) Do not set anything on the power cord.

4. ACCESSORY CHECK



Check the accessories and their quantities according to the following list:

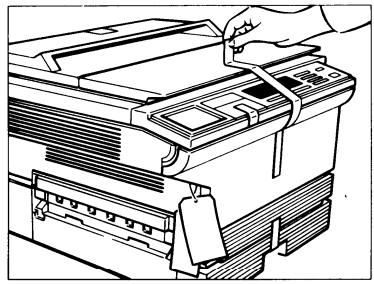
1. **Cassette ..... 2 pcs**
   (3 pcs for the Asian version machine [One cassette is in the machine.])
2. **Cassette Cover ..... 1 pc**
   (2 pcs for the Asian version machine)
3. **Copy Tray 1pc**
4. **Paper Tray ..... 1 pc**
5. **Master Unit ..... 1 pc**

NOTE: **Keep in the box until installing into the copier.**

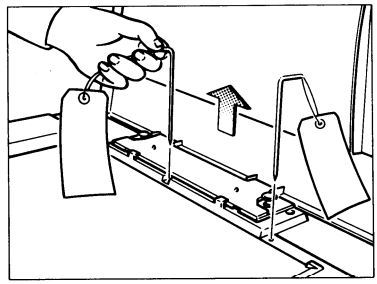
6. **Toner ..... 1 cartridge (Black)**
7. **Operating Instructions ..... 1 pc**
8. **N.E.C.R. ..... 1 pc**
9. **Envelope for N.E.C.R. (U.S.A. version only) ..... 1 pc**
10. **Multi-lingual Decal (European version only) ..... 1 pc**
11. **Paper Size Decal ..... 1 pc**

5. INSTALLATION PROCEDURE

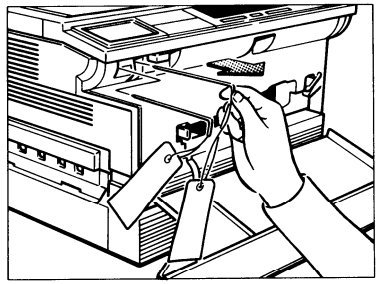
1. Remove the three strips of tape.



2. Open the platen cover and remove the two optics lock pins together with the tape.

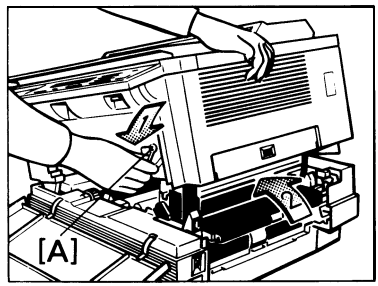


3. Open the front cover and remove the two optics lock pins together with the tape.

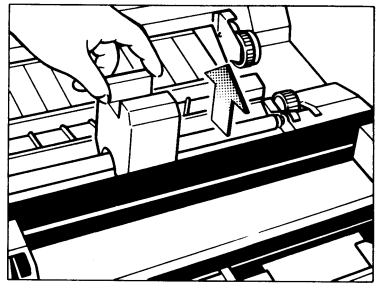


4. **Push down the release lever [A] to open the top unit.**

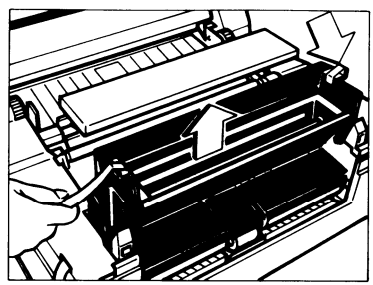
NOTE: In case the top unit does not open, push the top unit downwards while pressing the release lever.



5. Remove the roller cushion block.

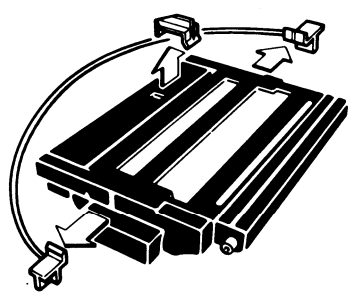


6. Remove the toner tank cover and the two strips of tape.

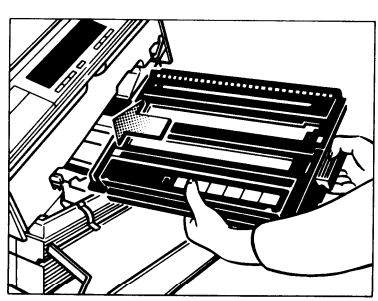


7. Remove the three wedges from the new master unit.

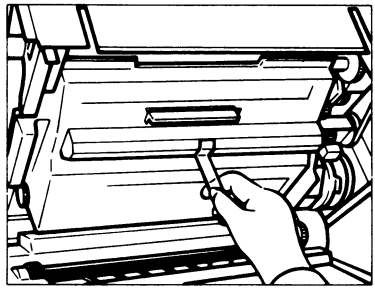
NOTE: Do not touch the master surface (purple material) and avoid exposing it to light.



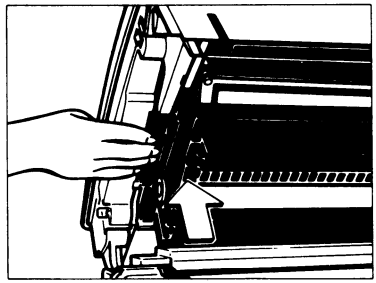
8. Insert the master unit into the copier.



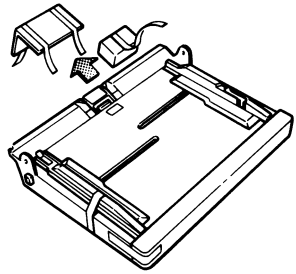
9. Peel off the strip of tape and remove the polyester cover that protects the master.



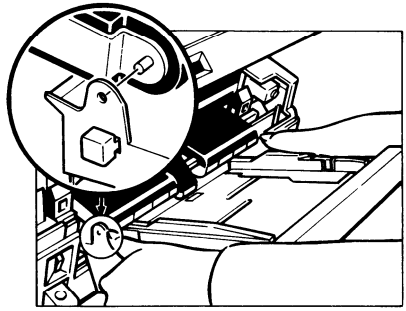
10. Push the master unit up until it locks in place.



11. Remove the cushion block, the friction pad cover, and two strips of tape from the paper tray.

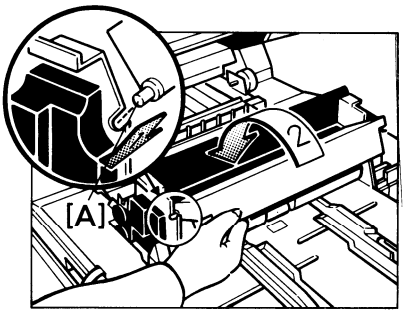


12. Install the paper tray on the right side of the machine.



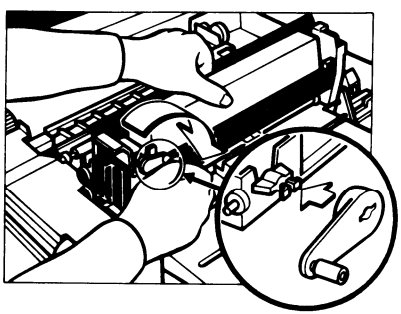
13. Shake the new cartridge of toner well.

14. Set the pins [A] of the toner cartridge into the slots on the development unit, and turn the cartridge counterclockwise.

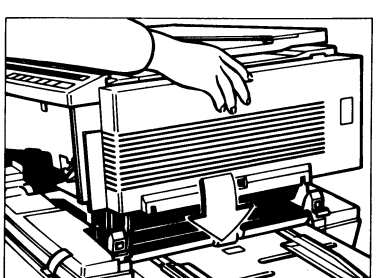


15. To open the cartridge seal, insert the cartridge crank onto the shaft of the toner cartridge and turn it clockwise unit it stops. Then, remove the cartridge crank.

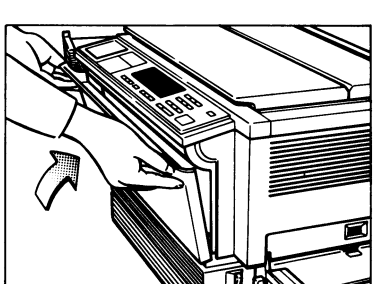
NOTE: At installation, it is recommended to load two cartridges of toner.



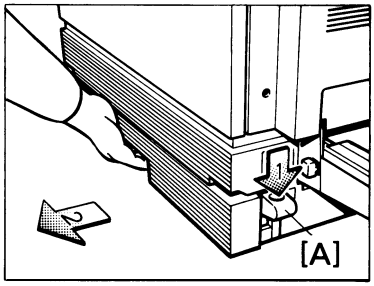
16. Lower the top unit.



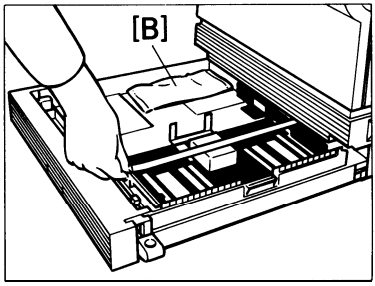
17. Close the front cover.



18. **Lower the cassette release lever [A] and pull out the cassette tray unit it stops.**



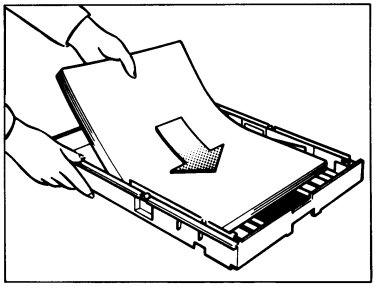
19. **Remove the strip of tape and the package of silica gel [B].**



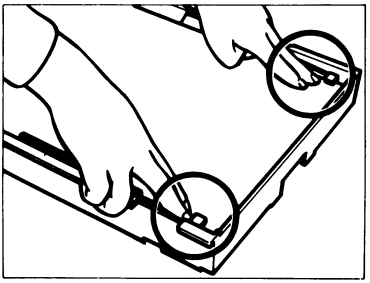
20 **Take out the cassette and remove the two cushion blocks [C].**

21. **Load paper into the cassette so it is flush with the front and side fences.**

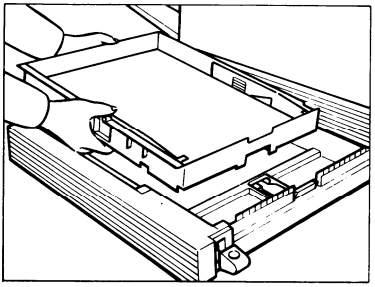
NOTE: The cassette holds approximately 250 sheets.



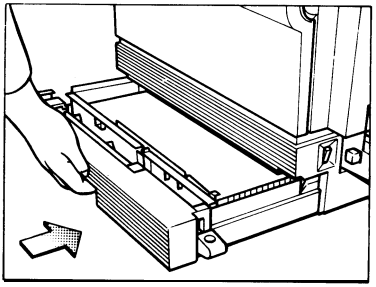
22. **Press down the corners of the paper stack so that they are underneath the corner separators.**



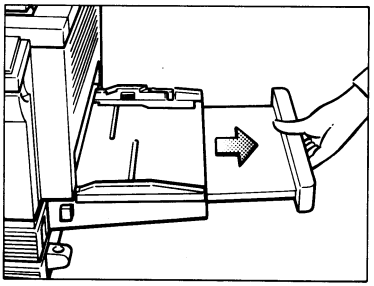
23. **Set the cassette on the cassette tray.**



24. **Push in the cassette tray until it stops.**

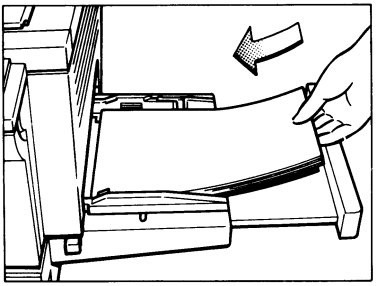


25. **Slide the drawer tray to the position of the paper size.**

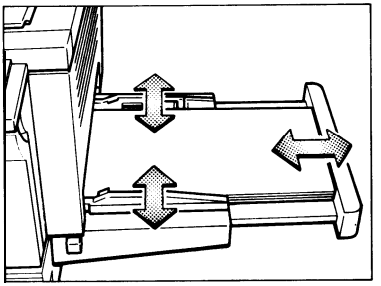


26. Load paper into the paper tray.

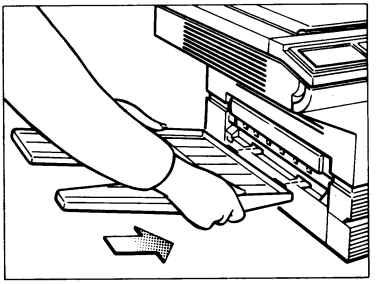
NOTE: The paper tray holds approximately 100 sheets.



27. Adjust the paper guides and the drawer tray so that they contact the paper stack firmly.

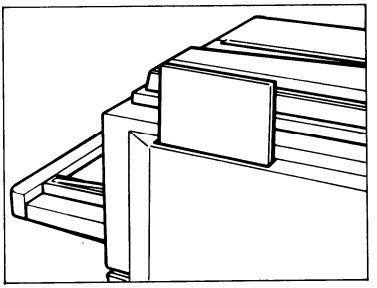


28. Install the copy tray on the left side of the machine.



29. When not using this instruction booklet, place it in the holder on the back of the copier.

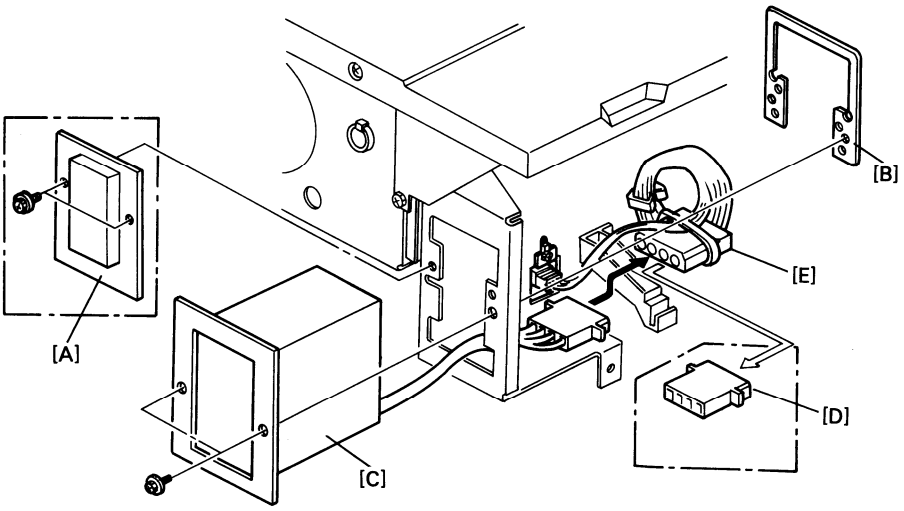
30. Check machine operation and copy quality. Fill 'out the New Equipment Condition Report.



INITIAL CONDITIONING

To condition the machine, make about 15 copies immediately after installation. (Copy image density may not be constant if this is not done.)

6. KEY COUNTER HOLDER INSTALLATION



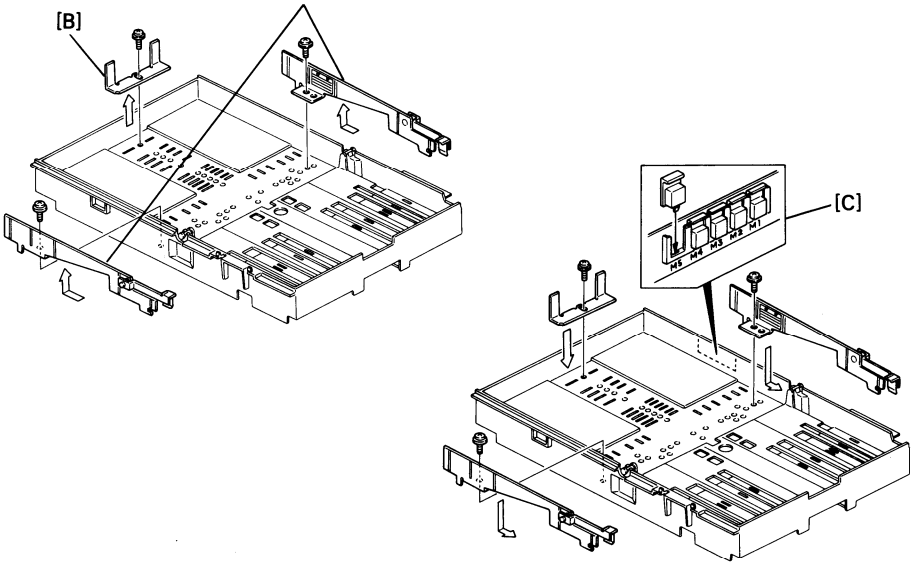
NOTE: Three types of counters are recommended for this copier (Ricoh, Hecon, and Hengstler key counters).

1. **Remove the upper right cover (4 screws), upper rear cover (2 screws), and the optics board (2 screws, 7 connectors).**
2. **Remove the key counter cover [A] and fixing plate [B] from the key counter bracket (2 screws).**
3. **Hold the fixing plate on the inside of the key counter bracket and insert the key holder [C].**
4. **Align the holes in the fixing plate with the mounting holes of the key counter holder and secure the key counter holder.**

NOTE: The fixing plate has three sets of holes. Make sure to use the holes that match the type of counter when installing.

5. **Remove the shorting plug [D] from the key counter connector [E].**
6. **Plug in the key counter harness.**
7. **Reassemble the copier. Insert the key counter and check its operation.**

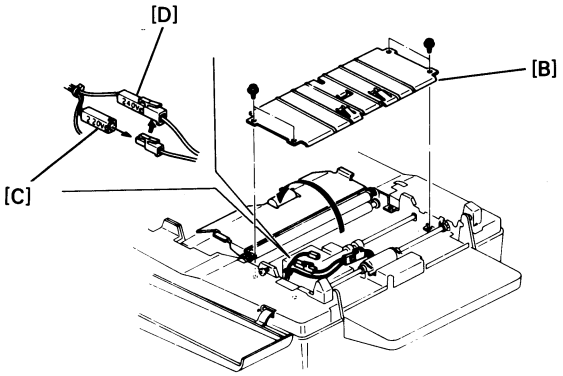
7. CASSETTE MODIFICATION

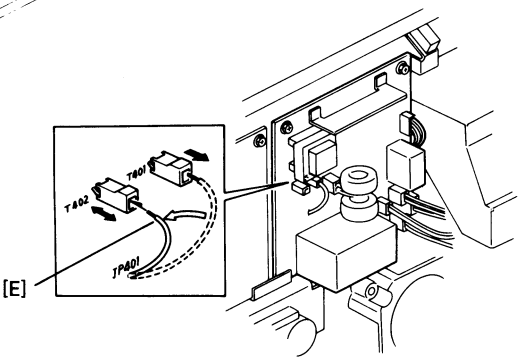


1. **Remove the side fences [A] and the rear fence [B] (1 screw each).**
2. **Reposition the fences to the desired paper size position.**
3. **Insert the paper size actuators [C] in the proper slots on the front of the cassette.**
4. **Attach the proper paper size decal on the side of the cassette.**

NOTE: Refer to the underside of the cassette for correct paper size actuator setting.

8. TRANSFORMER CONVERSION (220 -240 V)





1. **Open the top unit and remove the development unit.**
2. **Swing up the upper feed guide [A] (1 screw).**
3. **Remove the lower feed guide [B] (4 screws).**
4. **Uncouple the 220 V connector [C] and couple the 240 V connector [D].**
5. **Remove the upper rear cover (2 screws).**
6. **Shift the jumper wire [E] (JP401) on the ac drive board from T401 to T402.**

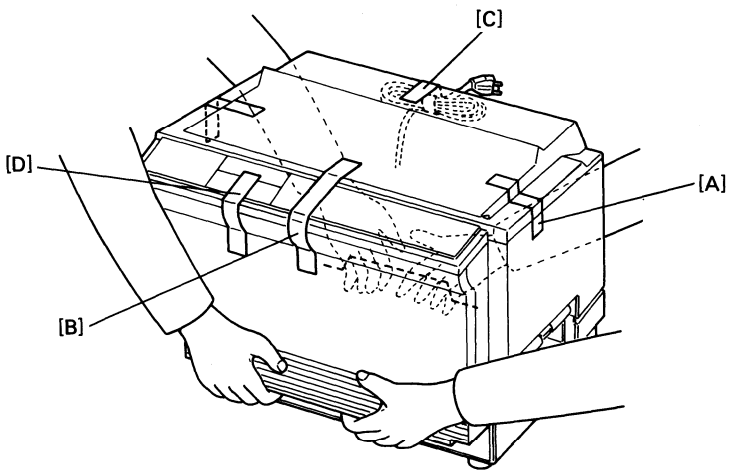
NOTE: Shift the terminal lock upwards to release the jumper wire and slide it down to secure the wire in position.

9. PREPARATION FOR TRANSPORTATION

CAUTION: The copier may be seriously damaged if it is moved without the following preparation.

NOTE: **If the copier is installed with a DF and/or sorter, remove them first. (See the DF and/or Sorter Installation Procedure.)**

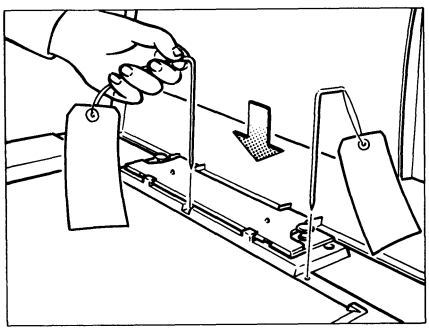
9.1 SHORT HAUL TRANSPORTATION

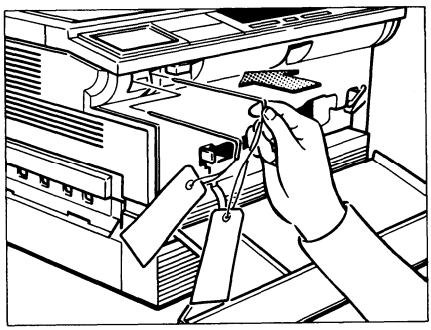


1. **Remove the copy tray and paper tray.**
2. **Remove the cassette tray.**
3. **Secure the following parts with tape:**
   - **a) platen cover [A]**
   - **b) front cover [B]**
   - **c) power supply cord (roll up first) [C]**
   - **d) function key covers [D].**

When transporting the copier, always use the grips on the front and rear of the machine. Never grip the bottom plate of the copier.

9.2 LONG HAUL TRANSPORTATION BY VEHICLE





NOTE: Confirm that the scanner is in the home position, and the copier is in the 100% reproduction mode before continuing this procedure.

1. Remove the copy tray and paper tray.

2. **Remove the cassette tray.**

3. Open the clamshell and remove the master unit,

NOTE: Do not scratch the master surface, and protect it from light as either can cause permanent damage to the master.

4. **Secure the development unit with strips of tape.**

5. Open the platen cover and secure the two optics lock pins [A] with tape.

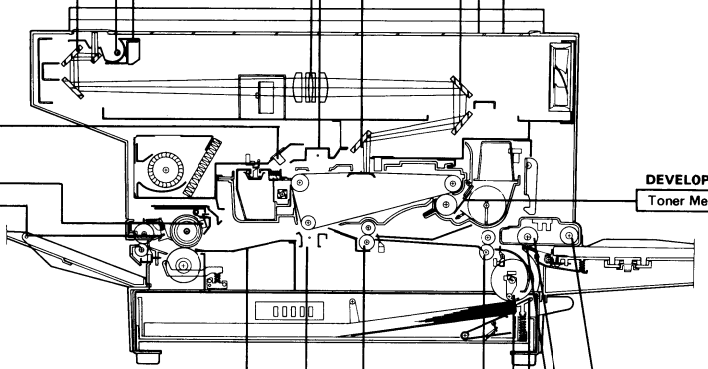
6. Open the front cover and secure the two optics lock pins [B] with tape.

NOTE: **After completing steps "5" and "6", check that the lens and scanner are locked in position.**

7. **Continue with step "3" of the Short Haul Transportation section.**

SECTION 4

SERVICE TABLES



OPTICS & EXPOSURE

Exposure Lamp	Dirty Copies
Reflector	Dirty Copies
Lens	Dirty Copies
Mirrors	Dirty Copies
Platen Cover Sheet	Dirty Copies
Exposure Glass	Dirty Copies

CHARGE CORONA

Charge Corona Wire	White Stripes

QUENCHING

Quenching Lamp	Dirly Copies

FUSING

Thermistor (Fusing)	Black Line
Hot Roller Suppers	Black Line

DEVELOPMENT

Toner Metering Blade	White Stripes

PAPER FEED

Pick-up Roller	Misfeed
Tray Feed Roller	Misfeed
Tray Friction Pad	Double Feed
Friction Pad	Double Feed
Cassette Feed Roller	Misfeed
Relay Roller	Misfeed
Registration Roller	Poor Registration

TRANSPORT

Transport Guide Plate	Dirty Copies (Back Side)

TRANSFER CORONA

Transfer Corona Wire	Faint Copies

2. MAINTENANCE TABLE

NOTE: At a service call, perform the following:

If this is not done, problems concerning copy quality and/or mechanical operation will occur. Also, some parts may become prematurely damaged.

SECTION	ITEM TO BE CLEANED	MATERIAL TO BE USED
Erase and Optics	1. Erase Lamp Unit With Master Sensor	Soft Cloth (Water) or Blower Brush
	2. Exposure Glass	Soft Cloth (Glass Cleaner)
	3. Platen Cover Sheet	Soft Cloth (Water or Alcohol)
	4. Exposure Lamp	Wet Soft Cloth, then Dry Soft Cloth
	5. Reflector	Silicone Cloth
	6. Auto ID Sensor	Blower Brush
	7. Lens/Mirrors	Silicone Cloth
Develop-ment and Quenching	1. Toner Metering Blade	Toner Agitator (when necessary)
	2. Quenching Lamp	Soft Cloth (Water) or Blower Brush
Paper Feed and Transport	1. Paper Feed Roller	Soft Cloth (Water)
	2. Friction Pad	Soft Cloth (water)
	3. Relay Roller	Soft Cloth (Water)
	4. Registration Roller	Soft Cloth (Water)
	5. Cassette Pad	Soft Cloth (Water)
	6. Paper Guide Plates	Soft Cloth (water)
	7. Paper Tray Pads	Soft Cloth (water)
	8. Pick-up Roller	Soft Cloth (Water)
	9. Tray Feed Roller	Soft Cloth (Water)

Continued on next page.

SECTION	ITEM TO BE CLEANED	MATERIAL TO BE USED
Fusing	1. Hot Roller Strippers 2. Thermistor 3. Paper Guide Plates	Soft Cloth (Water) Soft Cloth (Alcohol) Soft Cloth (Water)
Corona	1. Charge Corona Wire 2. Transfer Corona Wire 3. Corona Casing 4. Transfer Guide Plate	Corona Wire Cleaner or Blower Brush Cotton Swabs or Soft Cloth (Alcohol) Soft Cloth (Water) Soft Cloth (Water)
Others	1. Master Unit Grid Plate	Blower Brush

3. LUBRICATION TABLE

NOTE: Lubrication must be done within the number of copies indicated in the following table:

If this is not done, problems concerning copy quality and/or mechanical operation will occur. Also, some parts may become prematurely damaged.

SECTION	ITEM TO BE LUBRICATED	NO. OF COPIES	LUBRICATING MATERIAL
Optics	1. Optics guide rod cleaner	As Necessary	Launa oil
Paper Feed and Transport	1. Cassette Feed Clutch Spring	60K	Mobil Temp. 78
	2. Relay Clutch Spring	60K	Mobil Temp. 78
	3. Registration Clutch Spring	60K	Mobil Temp. 78
	4. Tray Feed Clutch Spring	60K	Mobil Temp. 78
	5. Pick-up Clutch Spring	60K	Mobil Temp. 78
Others	1. Master Clutch Spring	60K	Mobil Temp. 78

4. EXPECTED LIFE OF PARTS

NOTE: If the maintenance is carefully performed at a service call. the following main parts will work on for the expected service life:

SECTION	PART DESCRIPTION	EXPECTED SERVICE LIFE
Develop-ment	1. Toner Metering Blade	60K (Black) 6K (Color)
Paper Feed and Transport	1. Friction Pad 2. Tray Friction Pad	60K 60K
Fusing	1. Hot Roller 2. Hot Roller Strippers	120K 120K
Corona	1. Charge Corona Wire 2. Transfer Corona Wire	80K 80K

5. GENERAL SERVICE TABLES

5.1 **TEST POINTS**

5.1.1 Main PCB

NUMBER	FUNCTION
TP101	ADS voltage adjustment (using VR102)
TP102	GND

5.1.2 AC Drive **PCB**

NUMBER	FUNCTION
TP401	Factory use
TP402	Factory use
TP403	Factory use
TP404	Factory use
TP405	Factory use

5.1.3 DF **Main PCB**

NUMBER	FUNCTION
TP102	+ 5V
TP103	GND
TP104	Factory use
TP105	+12V
TP106	+ 24V
TP107	Factory use

5.2 VARIABLE RESISTORS

5.2.1 Main PCB

NUMBER	FUNCTION
VR101	Light intensity adjustment
VR102	ADS adjustment

5.2.2 Power Pack

NUMBER	FUNCTION
VR	Factory use (Transfer / Bias Power pack)
VR-C	Factory use (Charge Power pack)

5.2.3 Master Sensor (Erase Lamp Unit)

NUMBER	FUNCTION
VR1	Factory use

5.2.4 DF Main PCB

NUMBER	FUNCTION
VR101	Factory use
VR102	Original leading edge registration adjustment (One-sided original mode)
VR103	Original leading edge registration adjustment (Two-sided original mode)
VR106	Factory use

5.3 DIP SWITCHES

5.3.1 Main PCB

DIPSWITCH101 1=Switch ON 0=Switch **OFF**

DIP SWITCH 101			FUNCTION
1	2	3	Leading edge registration
0	0	0	Decrease (-)
1	0	0	
0	1	0	Variation per step; Approx. 1.3 mm (0.051")
1	1	0	
0	0	1	
1	0	1	
0	1	1	
1	1	1	Increase (+)

4	1	Test mode
	0	Normal
5	1	Free run mode
	0	Normal
6	Must be on	
7	1	Fusing lamp phase control
	0	Fusing lamp switching control (Normal)
8	1	Normal
	0	"U3" displayed if sorter out of position
9	1	Reduced transfer current
	0	Normal
10	Not used	

- Free Run -

- Feed solenoids and the total counte are by-passed.
- When a self-diagnostic code is displayed, the copier stops.
- Every **0.4** second, the registration solenoid and relay feed solenoid turn on and off together.

- Fusing Lamp Control -

- Remove transistor Q301 on the fusing power supply PCB in order to utilize the fusing lamp phase control.

5.3.2 Optics PCB

DIP SWITCH 701

DIP SWITCH 701				FUNCTION
1	1	Scanner free run made		
	0	Normal		
2	3	4		Leading edge erase
0	0	0		Decrease (-)
0	0	1		
0	1	0		Variation per step: Approx. 0.3 mm (0.032")
0	1	1		
1	0	0		
1	0	1		
1	1	0		
1	1	1		Increase (+)
5	6	7	8	Vertical magnitication
0	0	0	0	Slower (larger)
0	0	0	1	
0	0	1	0	
0	0	1	1	
0	1	0	0	
0	1	0	1	
0	1	1	0	Variation per step Approx. 0.2 % (Fire adjustment)
0	1	1	1	
1	0	0	0	
1	0	0	1	
1	0	1	0	
1	0	1	1	
1	1	0	0	
1	1	0	1	
1	1	1	0	
1	1	1	1	Faster (smaller)

DIP SWITCH 702

DIP SWITCH 702				FUNCTION
				Vertical Magnification
1	2	3	4	**Slower** (Larger) Variation per step: Approx. 1.4% (rough adjustment) **Faster** (Smaller)
0	0	1	1	
0	0	1	0	
0	0	0	0	
0	1	0	0	
1	0	0	0	

5.3.3 DF PCB

DIP SWITCH 101

DIP SWITCH 101				FUNCTION
1	2	3	4	
1	1	0	0	Normal
1	0	0	1	1 sided free run
0	1	0	1	2 sided free run
0	0	1	1	Solenoid test: SW101 - solenoids ON SW102 - solenoids OFF
1	1	0	1	Motor test (lift switch must be ON)
1	1	1	1	All indicators ON

NOTE: a) When the main switch is turned on, the DPS 101 setting must be normal, in order that the initial sequence between the copier and DF can take place.

b) When utilizing the free run modes, the lift switch must be ON and SW101 pressed.

6. TEST MODE

This mode is used to make various adjustments and to check the operation of electrical devices. Turn on DPS101 -4 (main PCB), and turn on the main switch. Press the Start key to energize a mode, and press the C/S key to de-energize it.

Entered No. (Number keys)	Operation
1	Charge on -to check the charge power pack
2	Transfer on -to check the transfer power pack
3	Exposure lamp on - to check the exposure lamp
4	All indicators on -to check the indicators on the operation panel
5	ADS adjustment mode - to adjust the auto ID sensor
7	Charge and transfer on -to check the charge and transfer power pack.

NOTE: a) In test mode "5", as a safety factor, the exposure lamp turns off after 20 seconds.

b) As test mode "3 has no auto-off function, do not leave it on for a long time.

c) For modes, "1", "2" and "7", remove the master from the machine.

7. SERVICE REMARKS

7.1 MASTER UNIT

1. Never touch the master belt and do not apply oil or an organic solvent to the master belt surface.
2. When the master unit is out of the machine or the upper clamshell is open, avoid exposing it to a bright light or direct sunlight to prevent the master belt from light fatigue.
3. Always store the master unit in a cool and dry place.
4. Do not leave master units in vehicles during hot weather. It does not matter whether the master units are installed in machines or are separate.
5. The variable resistor for adjusting the master sensor is factory pre-set and should not be adjusted in the field.
6. Keep the master unit level when it is out of the copier.

7.2 CHARGE

1. The variable resistor (VR-C) is factory pre-set and should not be adjusted in the field.
2. Do not touch the corona wire with oily hands.
3. Instruct the operator how and when to use the corona wire cleaner.
4. Clean the corona wire at every service call.
5. Clean the grid plate with a blower brush.

7.3 OPTICS

1. Clean the reflector, lens, mirrors, and exposure lamp at every service call.
2. The mirror assembly positioning screw is factory pre-set and should not be adjusted in the field.
3. The exposure lamp position should be adjusted when the exposure lamp has been removed or replaced.
4. Check the copy image at every service call and adjust it if necessary.

7.4 DEVELOPMENT

1. When white vertical lines appear on the copy, use the toner agitator to clean the toner metering blade.

2. Do not use the toner agitator unless copy image problems occur. This is to prevent damaging the toner metering blade.

3. Be careful not to nick or scratch the development roller surface.

4. Be careful not to use a black development unit for color copying, or a color development unit for black copying.

5. Always store toner in a cool and dry place.

6. Instruct the operator to ensure that the appropriate color plate is attached to all color development units.

7.5 TRANSFER

1. The variable resistor (VR) on the transfer/bias power pack is factory pre-set and should not be adjusted in the field.

2. Do not touch the transfer corona wire with oily hands.

3. Clean the transfer corona wire with a soft cloth at every service call.

7.6 PAPER FEED

1. Do not allow the paper feed rollers to become oily or dirty

2. The improper installation of paper size actuators causes misfeeds and erase problems.

3. Instruct the operator on proper OHP copying procedure. One sheet of OHP transparency should be loaded at a time and the OHP transparency lever should be pushed down when copying.

4. The improper setting of side and rear fences of the paper tray may cause erase problems, paper skew, and misfeeds.

7.7 FUSING

1. Be careful not to damage the hot roller strippers,

2. **Do** not touch the fusing lamp with your bare hands.

3. Make sure that the fusing lamp does not contact the hot roller.

4. Clean the fusing thermistor and hot roller strippers at every service call.

8. SPECIAL TOOLS AND LUBRICANTS

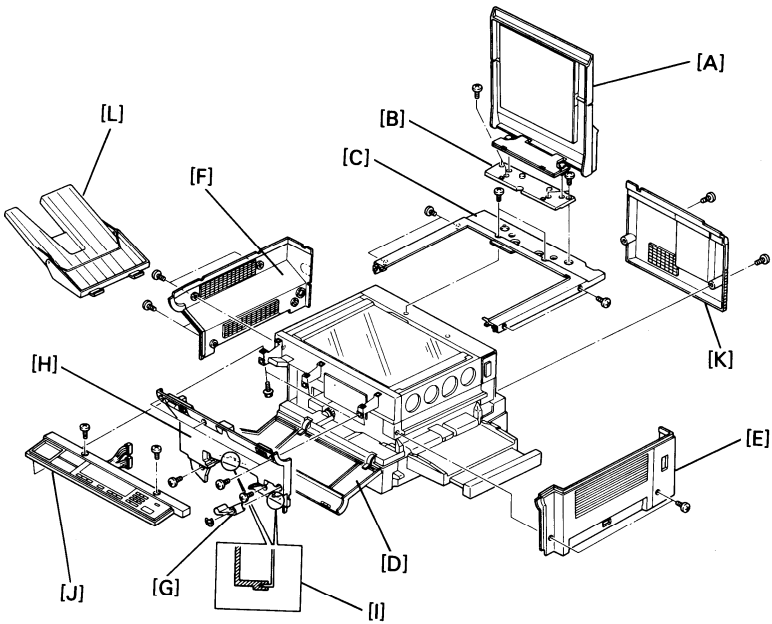
NO.	DESCRIPTION	PART NO.	REMARKS
1.	Positioning Ring	5216 9003	
2.	Test Chart OS-A3	5420 9502	100sheets/set
3.	Digital Multimeter	5420 9507	BECKMAN RMS3030
4.	Deluxe Test Lead Accessory Kit	5420 9508	BECKMAN DL241
5.	Grease - Mobil Temp. 78	**5447 9078**	400g/can
6.	Grease - Shin-etsu Silicone G-501	5203 9501	50g/bottle
7.	Launa Oil	5442 9103	

SECTION 5

REPLACEMENT AND ADJUSTMENT

1. EXTERIOR

1.1 UPPER CLAMSHELL COVER REMOVAL



1.1.1 Platen Cover

1. Remove the platen cover [A] (2 push-locks) by lifting it upwards.

1.1.2 Upper Cover

1. Remove the platen cover.
2. Remove the platen cover pedestal [B] (4 screws).
3. Remove the upper cover [C] (6 screws).

1.1.3 Upper Right Cover

1. Open the front cover [D].
2. Remove the upper right cover [E] (2 screws).

1.1.4 Upper Left Cover

1. Open the front cover.
2. Remove the upper left cover [F] (4 screws).

1.1.5 Inner Cover

1. Open the clamshell and remove the release lever [G] (1 E-ring).
2. Remove the inner cover [H] (5 screws).

NOTE: When installing the inner cover, make sure that the positioning tabs [I] engage with the metal frame correctly.

1.1.6 Operation Panel

1. Remove the inner cover (1 E-ring, 5 screws).
2. Remove the operation panel [J] (5 screws, 2 connectors).

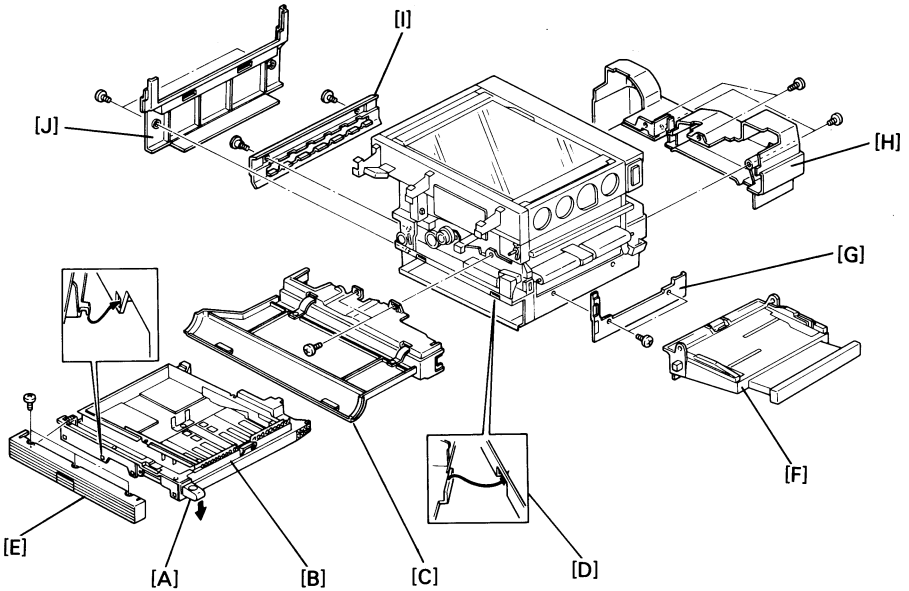
1.1.7 Upper Rear Cover

1. Remove the upper rear cover [K] (2 screws).

1.1.8 Copy Tray

1. Pull out the copy tray [L].

1.2 LOWER CLAMSHELL COVER REMOVAL



1.2.1 Front Cover

1. Lower the cassette release lever [A] and pull out the cassette tray [B].
2. Open the clamshell.
3. Remove the front cover [C] (2 screws).

NOTE: When installing the front cover, make sure the tabs [D] engage with the positioning notches.

1.2.2 Cassette Tray Cover

1. Lower the cassette release lever and pull out the cassette tray.
2. Remove the cassette tray cover [E] (3 screws).

1.2.3 Paper Tray

1. Open the clamshell.
2. Remove the paper tray [F].

1.2.4 Lower Right Cover

1. Lift up the paper tray and remove the lower right cover [G] (2 screws).

1.2.5 Lower Rear Cover

1. Remove the upper rear cover (2 screws).
2. Open the clamshell.
3. Remove the lower rear cover [H] (4 screws).

NOTE: The longer screw is used to prevent the upper feed guide plate from being turned over.

1.2.6 Lower Left Cover

1. Remove the following covers:

   a) front cover (2 screws)
   b) upper rear cover (2 screws)
   c) lower rear cover (4 screws).

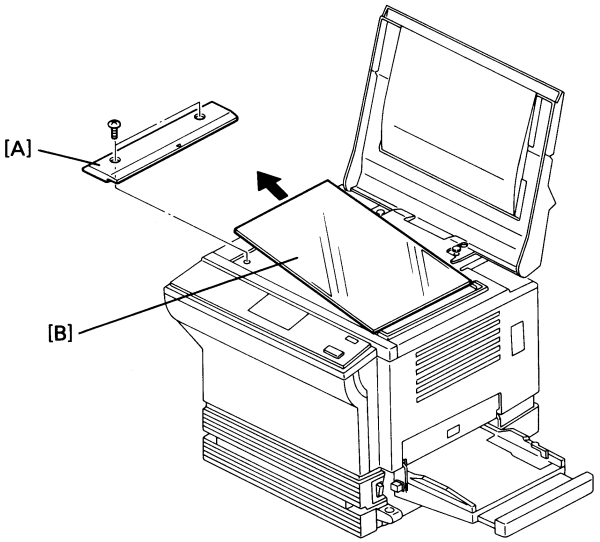
2. Pull out the copy tray and remove the exit cover [I] (2 screws).
3. Remove the lower left cover [J] (2 screws).

1.2.7 Exit Cover

1. Pull out the copy tray.
2. Remove the exit cover (2 screws).

2. OPTICS

2.1 EXPOSURE GLASS REMOVAL

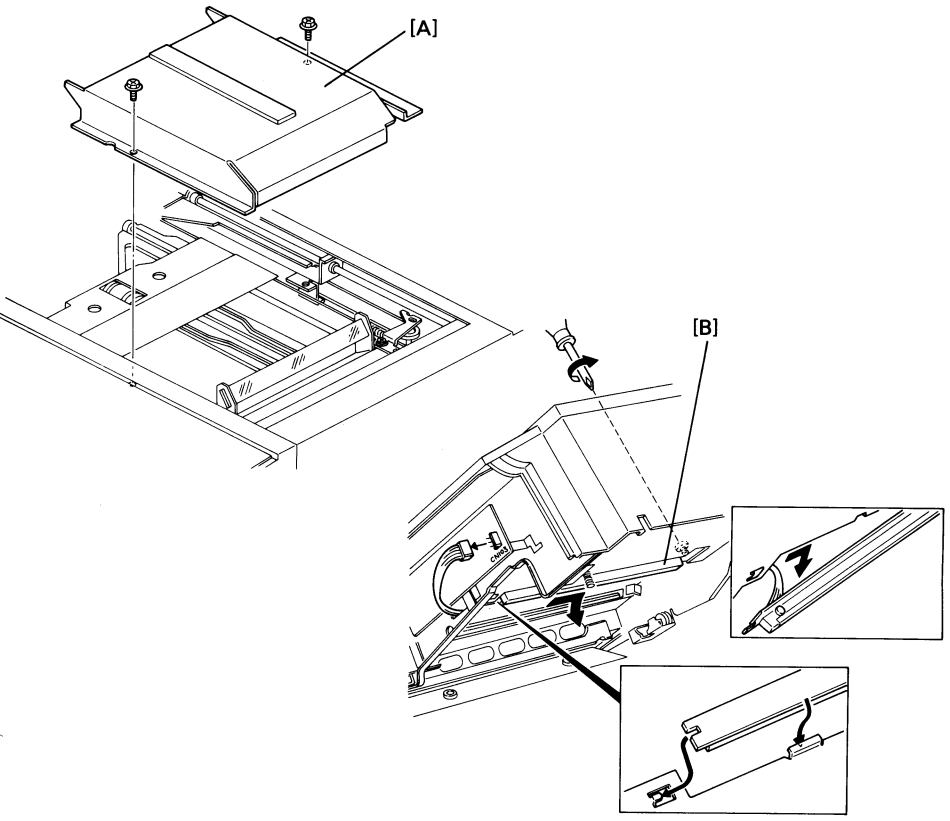


1. Remove the left scale [A] (2 screws).
2. Slightly lift up the left edge and slide out the exposure glass [B].

NOTE: a) Place the exposure glass on a sheet of paper in order not to scratch the surface.

b) When reinstalling the exposure glass, make sure the side with the red mark is facing upwards, in order to keep the original transportability in DF mode.

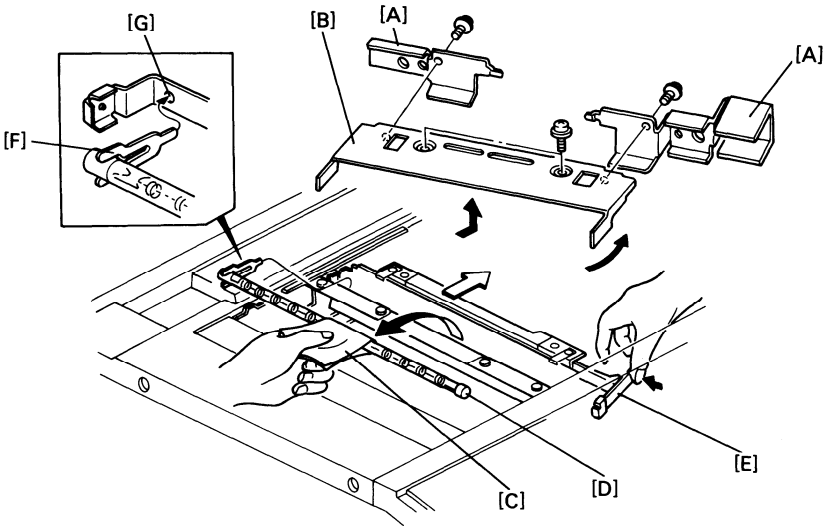
2.2 ERASE LAMP UNIT REPLACEMENT



1. **Turn off the main switch, and unplug the copier.**
2. **Open the front cover and remove the inner cover (1 E-ring, 5 screws).**
3. **Remove the exposure glass (2 screws).**
4. **Remove the lens cover [A] (2 screws).**
5. **Open the clamshell and remove the master unit.**
6. **Remove the erase lamp unit [B] (1 screw, 1 connector).**

NOTE: When installing the erase lamp unit, make sure the cut-out in the lamp fits over the metal tab (see illustration).

2.3 EXPOSURE LAMP REPLACEMENT



CAUTION: Do not touch the reflector or the new exposure lamp with your bare hands. Use a strip of paper to handle the lamp as oil from your fingers will discolor the lamp due to the heat.

1. **Turn off the main switch and unplug the copier.**
2. **Remove the exposure glass (2 screws).**
3. **Move the 1st scanner to the center of the optics cavity.**
4. **Remove the front and rear exposure lamp terminal covers [A] (1 screw each).**
5. **Remove the reflector cover [B] (2 screws).**
6. **Wrap a strip of paper [C] around the exposure lamp [D] as shown.**
7. **Press the release lever [E] of the front lamp terminal and lift out the exposure lamp.**
8. **Fit the lamp stopper [F] to the rear terminal of the new exposure lamp, and install the lamp using the strip of paper.**

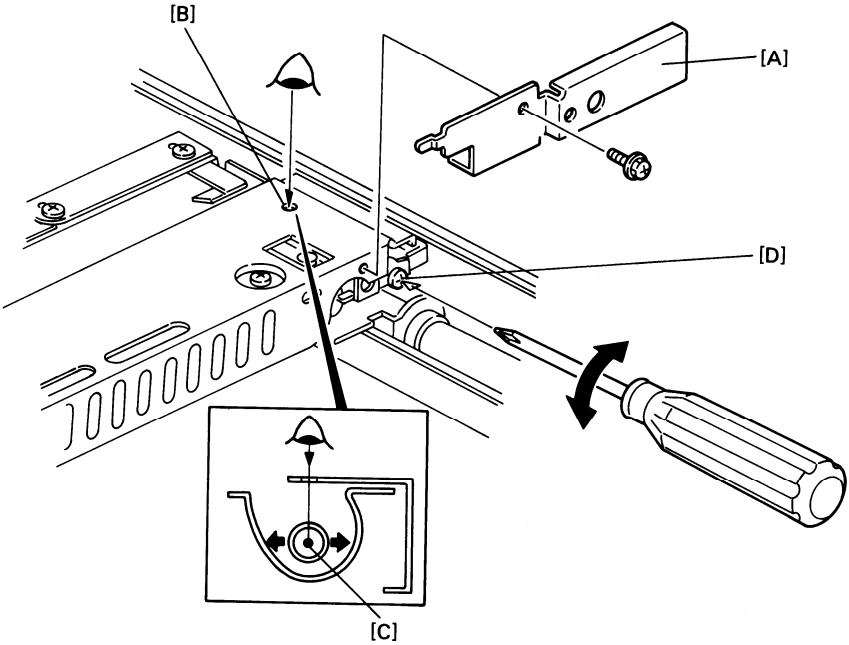
NOTE: Make sure the stopper fits in the terminal hole [G].

9. Reassemble the 1st scanner.

10. Check that the exposure lamp position is correct (see Exposure Lamp Position Adjustment section).

NOTE: The lamp stopper is fixed to the exposure lamp in order to prevent possible lamp rotation.

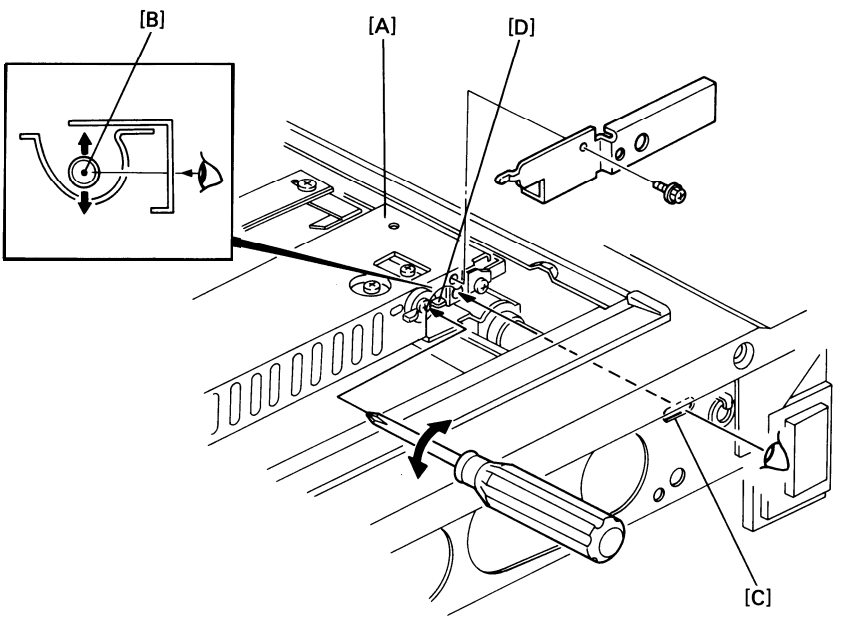
2.4 EXPOSURE LAMP POSITION ADJUSTMENT



1. Turn off the main switch and unplug the copier.
2. Remove the exposure glass (2 screws).
3. Move the 1st scanner to the center of the optics cavity.
4. Remove the front and rear exposure lamp terminal covers [A] (1 screw each).

2.4.1- Horizontal Adjustment =

5. View the exposure lamp filament through the front and rear sight holes [B]. The filament [C] should be directly beneath the sight holes.
6. To correct the position of the filament, turn the front and rear adjusting screws [D].



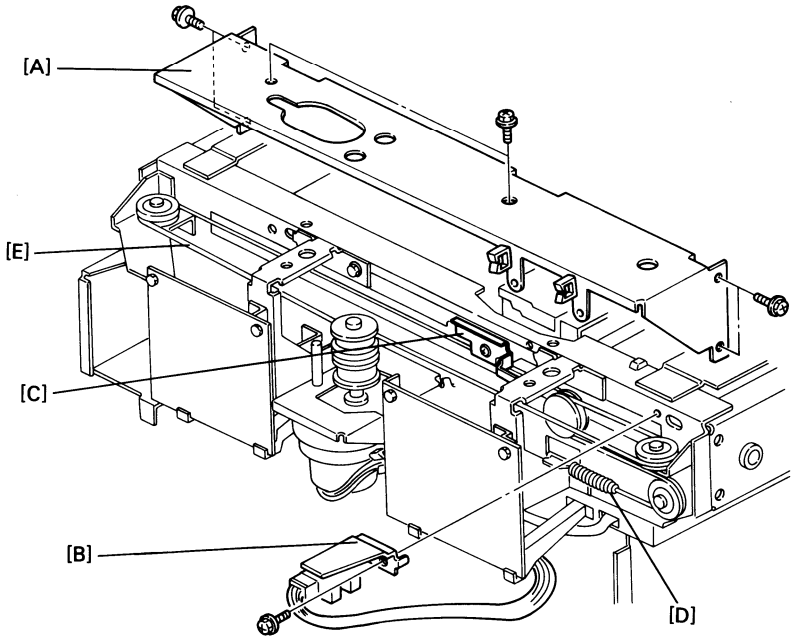
2.4.2 - Vertical Adjustment -

7. Remove the upper right cover (2 screws).

8. Move the 1st scanner [A] to the center of the optics cavity and view the exposure lamp filament [B] through the holes [C] in the right optics frame. The filament should be centered within the sight holes.

9. To correct the position of the filament, turn the front and rear adjusting knobs [D].

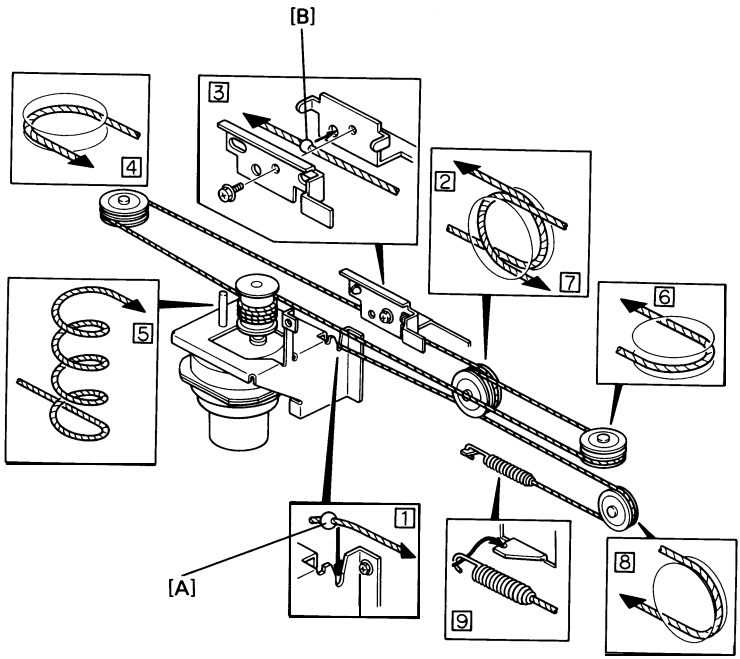
2.5 SCANNER DRIVE WIRE REPLACEMENT



1. **Turn off the main switch and unplug the copier.**
2. **Remove the following parts:**

   a) Platen cover
   b) Platen cover pedestal (4 screws)
   c) Left scale (2 screws)
   d) Exposure glass
   e) Upper cover (6 screws)
   f) Upper left cover (4 screws)
   g) Upper rear cover (2 screws)
   h) Upper right cover(2 screws).

3. **Remove the optics rear stay [A] (6 screws, 2 wire clamps).**
4. **Remove the home position sensor assembly [B] (1 screw).**
5. **Loosen the wire clamp screw [C], unhook the tension spring [D], and remove the scanner drive wire [E].**



6. Hook the end bead [A] of the new wire in the anchorage point [1], and run it over the pulleys in the following order:

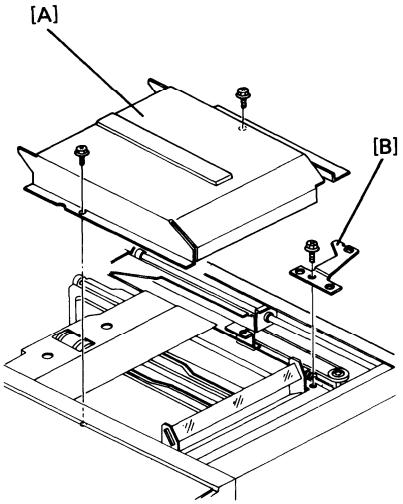
   a) inner track of WP1 [2]
   b) via the wire clamp [3] to WP2 [4] (lower track)
   c) inner to outer on WP3 [5] (4 times) to WP4 [6] (lower track)
   d) outer track of WP1 [7] and over WP5 [8].

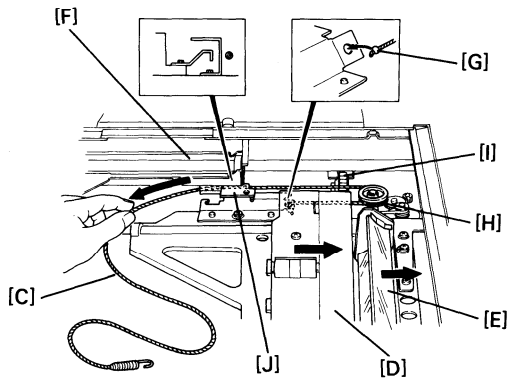
7. Hook the tension spring [9] to its anchorage position.

8. Fix the 1st scanner to the wire so that the wire clamp catches the wire bead [B].

NOTE: Rotate the scanner drive pulley in order to confirm that the scanner drive wire moves smoothly and that it does not overlap at any point,

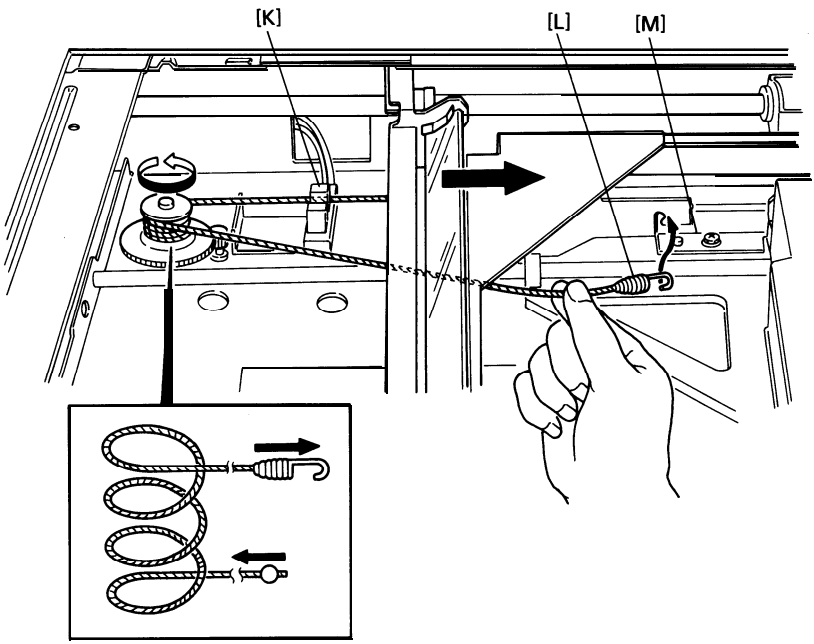
2.6 LENS DRIVE WIRE REPLACEMENT





1. **Turn off the main switch and unplug the copier.**
2. **Remove the exposure glass (2 screws).**
3. **Remove the lens cover [A] (2 screws).**
4. **Remove the mirror home position actuator [B] (1 screw).**
5. **Remove the lens drive wire [C].**
6. **Manually move the lens housing [D] all the way toward the mirror assembly [E], and place the 1st scanner [F] in the home position.**
7. **Hook the bead of the new wire [G] in the anchorage point on the lens unit drive clamp.**
8. **Run the wire over WP1 [H].**
9. **Route the wire as follows:**

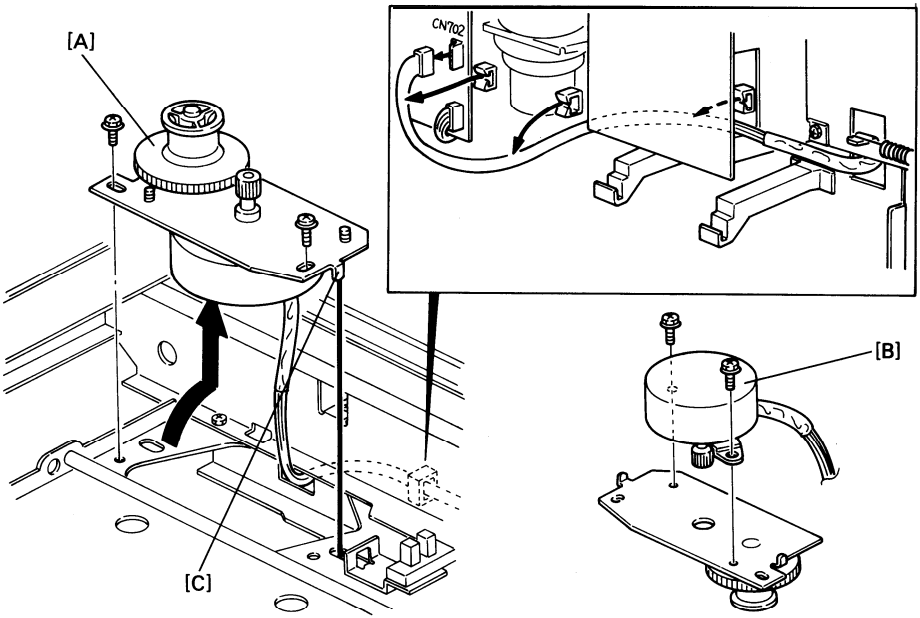
   a) **in front of the mirror home position sensor [I]**
   b) **behind the lens housing cover bracket [J]**
   c) **behind the lens home position sensor [K]**
   d) **over the lens drive pulley [L].**



10. Keeping the wire taut, move the 1st scanner towards the right in order to create space around the lens drive pulley as shown.
11. Run the wire 3 and a half times around the lens drive pulley (from bottom to top).
12. Keeping the wire taut, move the 1st scanner to its home position.
13. Pass the wire in front of the lens home position sensor and hook the tension spring [L] to its anchorage point on the lens unit drive clamp [M].

NOTE: Move the lens housing manually in order to confirm that the lens drive wire moves smoothly and that it does not overlap at any point on the lens drive pulley.

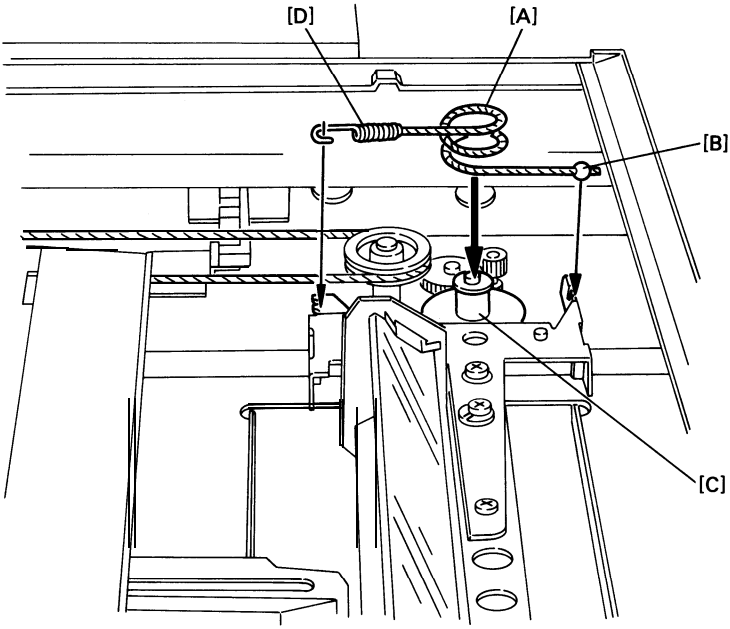
2.7 LENS DRIVE MOTOR REPLACEMENT



1. **Turn off the main switch and unplug the copier.**
2. **Remove the lens drive wire (see Lens Drive Wire Replacement section).**
3. **Remove the upper rear cover (2 screws).**
4. **Lower the ac drive board (2 screws).**
5. **Release the lens drive motor harness (1 connector, 3 wire clamps).**
6. **Move the 1st scanner to the return position.**
7. **Remove the lens drive motor assembly [A] (2 screws) by lifting the front side first.**
8. **Separate the motor [B] from the assembly (2 screws).**

NOTE: When installing the lens drive motor, make sure the metal tabs [C] of the motor bracket fit into the holes in the copier frame (see illustration).

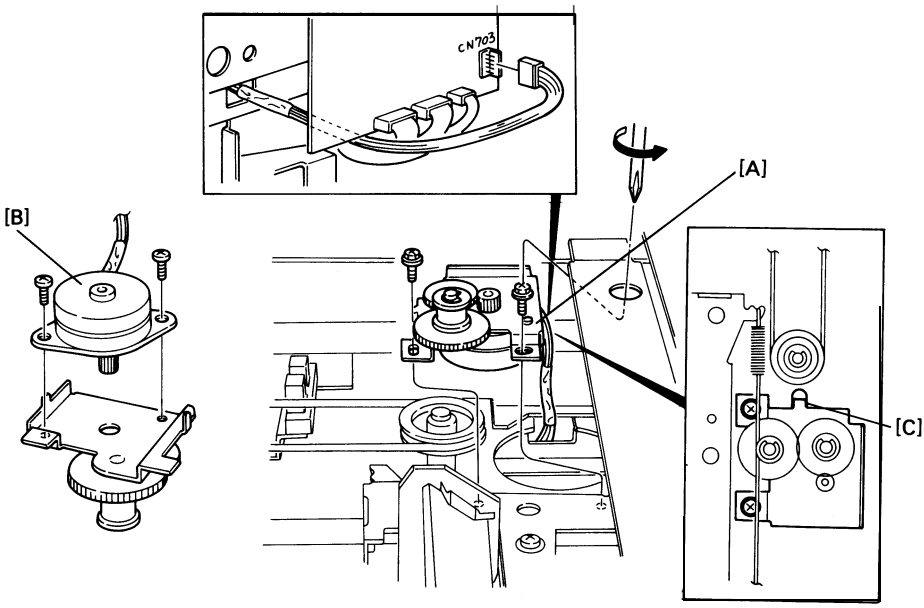
2.8 MIRROR DRIVE WIRE REPLACEMENT



1. Turn off the main switch and unplug the copier.
2. Remove the mirror home position actuator (see Lens Drive Wire Replacement section).
3. Remove the mirror drive wire [A].
4. Hook the bead [B] of the new wire in the anchorage point.
5. Run the wire 2 times around the mirror drive pulley [C] (bottom to top), and hook the tension spring [D] to its anchorage point.

NOTE: Move the mirror assembly manually in order to confirm that the wire moves smoothly and that it does not overlap at any point on the mirror drive pulley.

2.9 MIRROR DRIVE MOTOR REPLACEMENT



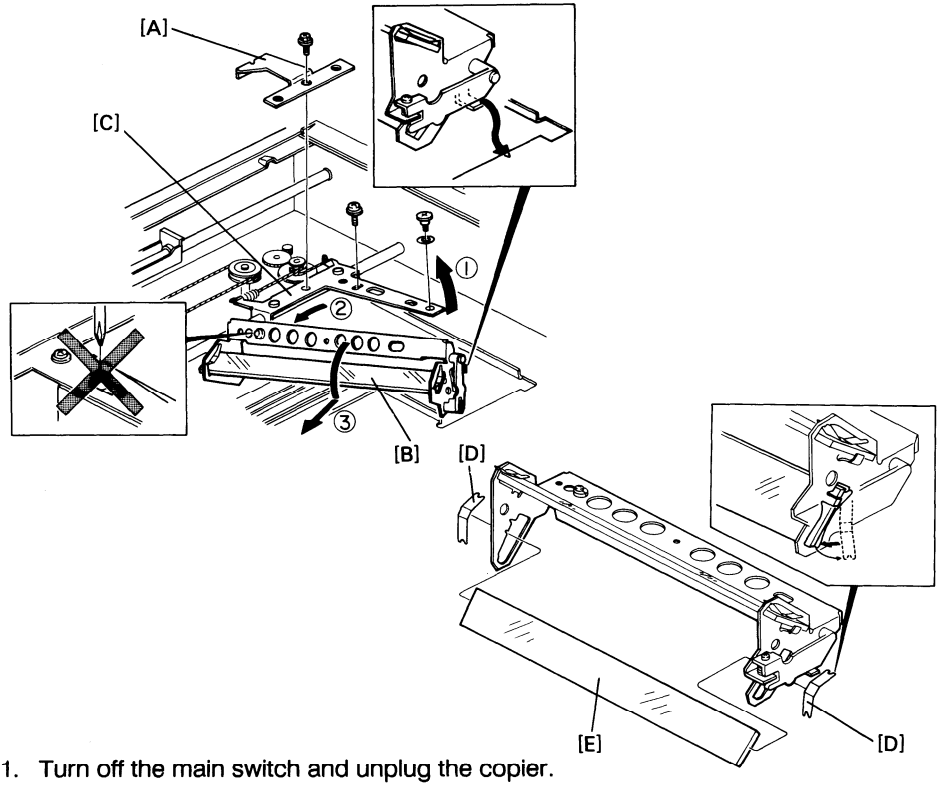
1. **Turn off the main switch and unplug the copier.**
2. **Remove the mirror drive wire (see Mirror Drive Wire Replacement section).**
3. **Remove the following parts:**

   a) Platen cover
   b) Platen cover pedestal (4 screws)
   c) Upper cover (6 screws)
   d) Upper rear cover (2 screws)

4. **Lower the optics board (2 screws, 2 connectors [CN701 & CN705]).**
5. **Remove the mirror drive motor assembly [A] (2 screws, 1 wire clamp, 1 connector).**
6. **Separate the motor [B] from the assembly (2 screws).**

NOTE: When installing the mirror drive motor, make sure the metal tabs [C] of the motor bracket fit into the holes in the copier frame (see illustration).

2.10 5TH MIRROR REPLACEMENT



1. Turn off the main switch and unplug the copier.

2. Remove the following parts:
   a) Left scale (2 screws)
   b) Exposure glass
   c) Lens cover (2 screws).

CAUTION: Do not adjust the eccentric cam on the mirror assembly. It is factory set.

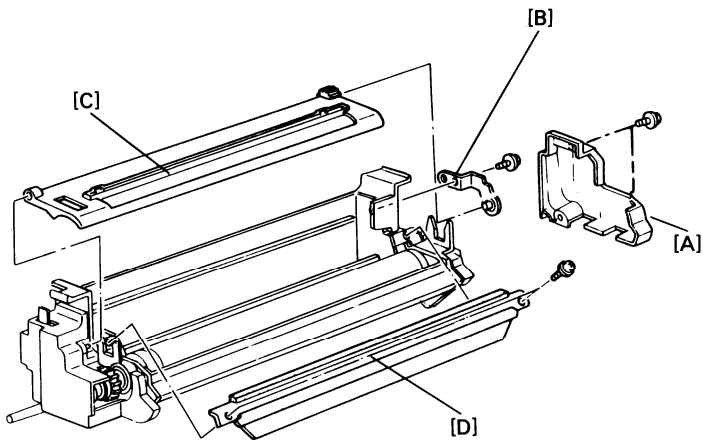
3. Remove the mirror home position actuator [A] (1 screw).

CAUTION: Take care not to scratch the mirror surfaces when removing the mirror assembly.

4. Move the mirror assembly to the center and remove it [B] (2 screws, 1 washer) while lifting the mirror drive plate [C] (see illustration).
5. Release the front and rear spring plates [D] and remove the 5th mirror [E].
6. Install the new mirror being careful not to scratch the mirror surface.

3. DEVELOPMENT and QUENCHING

3.1 TONER METERING BLADE REPLACEMENT

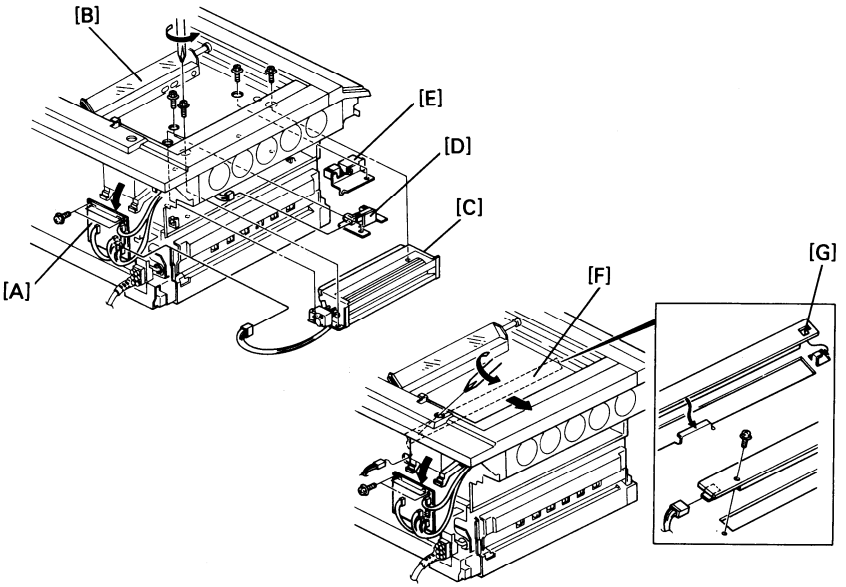


1. **Open the clamshell and remove the development unit.**
2. **Remove the toner cartridge.**
3. **Remove the front cover [A] of the development unit (2 screws).**
4. **Remove the roller cover bracket [B] (1 screw), and take off the development roller cover [C].**
5. **Remove the toner metering blade [D] (2 screws).**

NOTE: a) Avoid damaging or bending the metering blade.

b) Do not touch the surface of the development roller as it may become scratched.

3.2 QUENCHING LAMP REPLACEMENT



1. **Turn off the main switch and unplug the copier.**
2. **Remove the following parts:**

   a) Left scale (2 screws)
   b) Exposure glass
   c) Upper left cover (4 screws)
   d) Upper rear cover (2 screws).

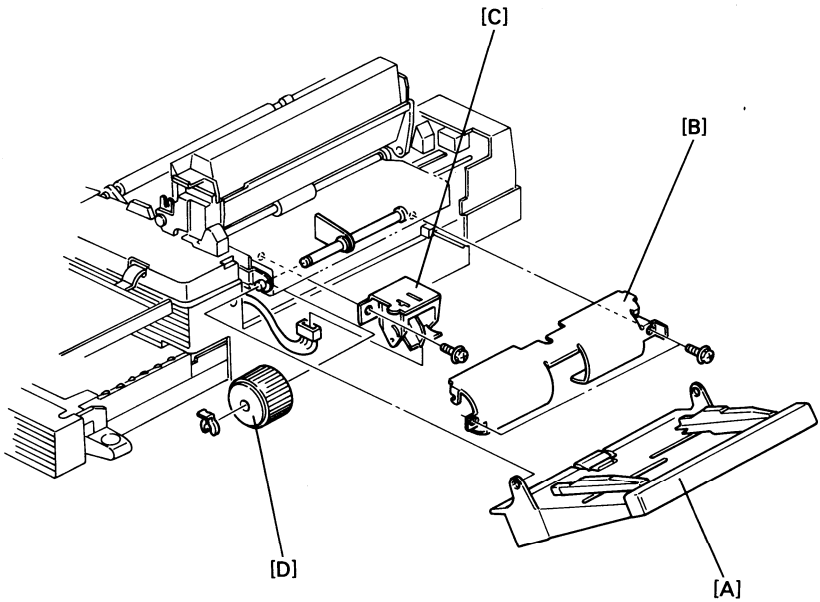
3. **Lower the ac drive board [A] (2 screws).**
4. **Move the 1st scanner [B] to the return position and remove the exhaust blower [C] (3 screws, 1 wire clamp, 1 connector).**
5. **Remove the toner overflow sensor assembly [D] (1 screw, 1 connector).**
6. **Remove the charge varistor [E] (1 screw).**
7. **Remove the quenching lamp [F] (1 screw, 1 connector) through the exhaust blower entrance.**

NOTE: a) When installing the lamp, make sure the positioning slot [G] fits over the projection of the copier frame (see illustration).

b) When installing the toner overflow assembly and charge varistor, make sure the metal tabs fit into the holes in the copier frame.

4. PAPER FEED

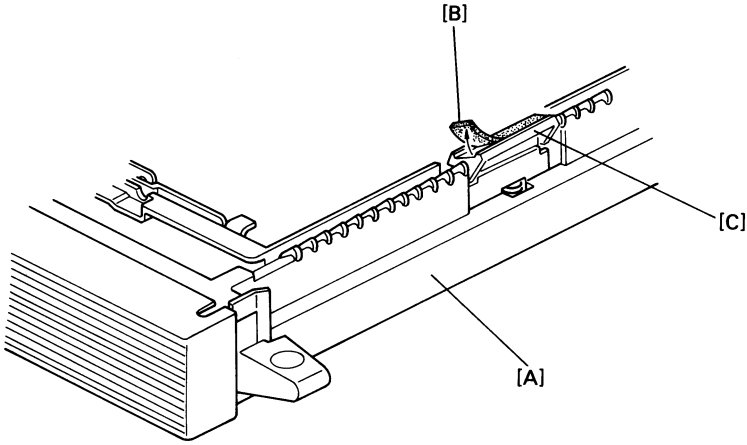
4.1 CASSETTE FEED ROLLER REPLACEMENT



1. Pull out the cassette tray.
2. Open the clamshell and remove the paper tray [A].
3. Remove the paper turn guide [B] (2 screws).
4. Remove the paper end sensor assembly [C] (1 screw).
5. Remove the cassette feed roller [D] (1 snap ring).

NOTE: Avoid touching the cassette feed roller surface with oily hands.

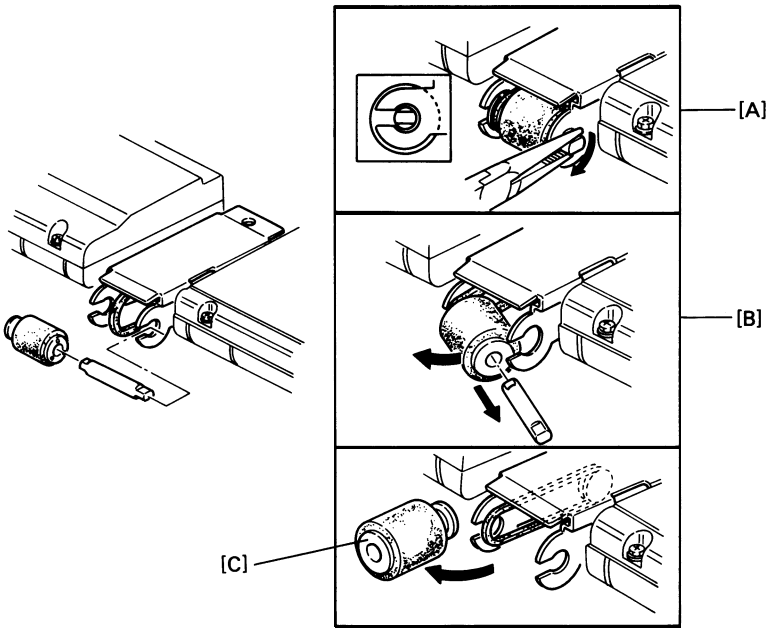
4.2 CASSETTE FRICTION PAD REPLACEMENT



1. Pull out the cassette tray [A] from the copier.
2. Peel off the friction pad [B] from the friction pad holder [C],
3. Install a new friction pad.

NOTE: Avoid touching the friction pad with oily hands.

4.3 PICK-UP ROLLER REPLACEMENT

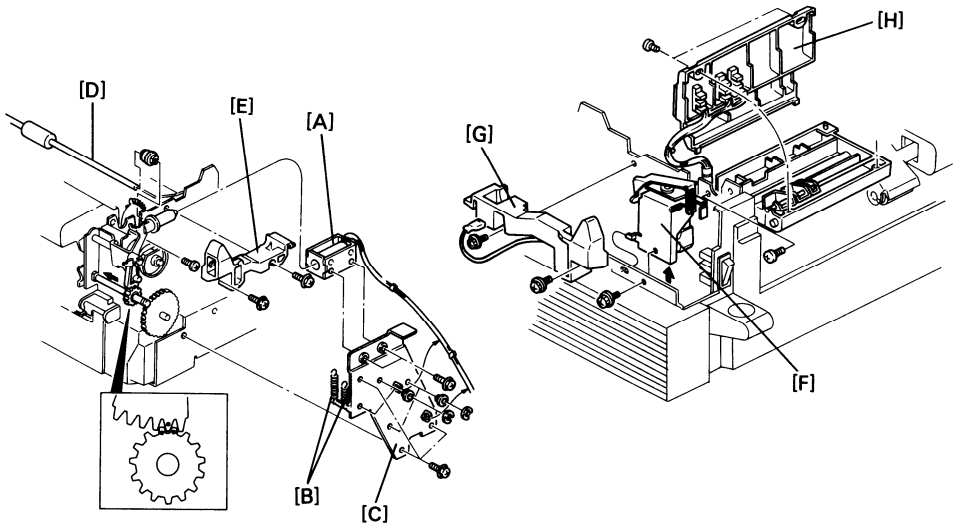


1. Remove the paper tray.
2. Rotate the pick-up roller shaft so that the flat sides align with the shaft holder openings [A].
3. Pull the rear end of the roller shaft toward the right and slide it to the rear [B].
4. Remove the pick-up roller [C].

NOTE: a) After reinstalling the pick-up roller, rotate the roller shaft so that the flat sides do not align with the shaft holder openings.

b) Avoid touching the pick-up roller surface with oily hands.

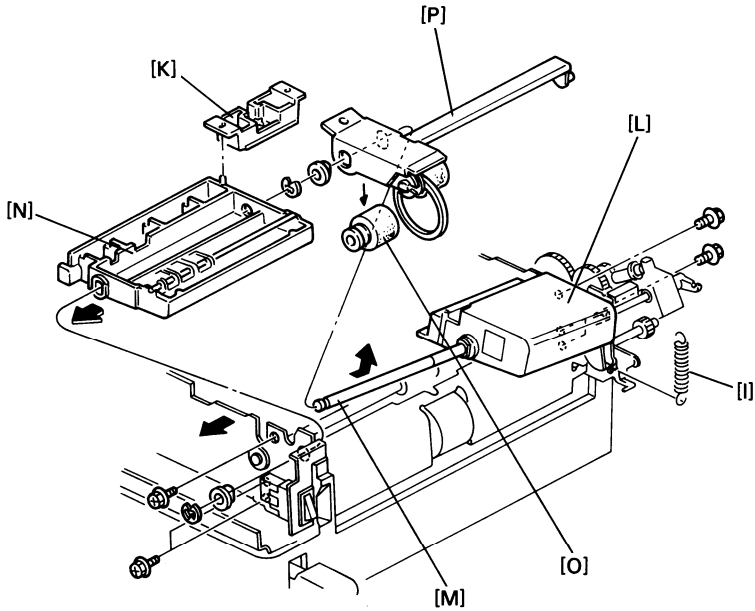
4.4 TRAY FEED ROLLER REPLACEMENT



1. Turn off the main switch and unplug the copier.
2. Remove the front cover (2 screws), paper tray, upper rear cover (2 screws), and the lower rear cover (4 screws).
3. Open the clamshell and remove the development unit.
4. Remove the tray feed solenoid [A] (2 screws, 2 wire clamps).
5. Unhook the sector gear spring and the tray feed solenoid spring [B].
6. Remove the cassette feed clutch bracket [C] (3 screws, 4 E-rings, 4 bushings).
7. Remove the upper relay roller [D] (2 springs and 2 bushings).
8. Remove the rear development unit supports [E] (2 screws).
9. Remove the safety switch assembly [F] (1 screw).

NOTE: It is not necessary to disconnect the safety switch.

10. Remove the front development unit support [G] (2 screws).
11. Remove the width sensor cover [H] (2 screws).

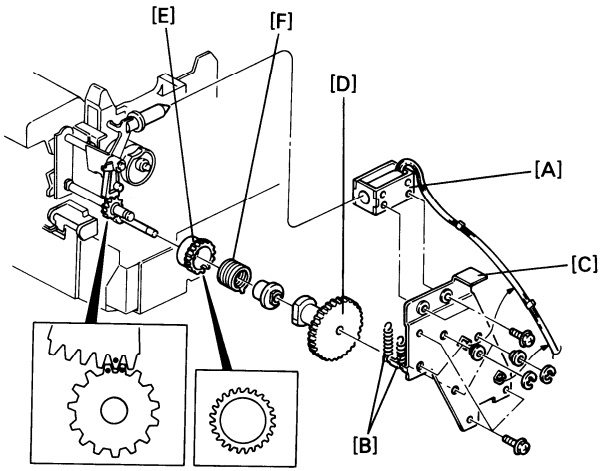


12. Unhook the pick-up stay spring [I].
13. Remove the front and rear screws securing the feed roller housing [J] (3 screws).
14. Remove the housing stay [K] and the pick-up stay cover [L] (2 screws).
15. Remove the E-ring and bushing from the front of the tray feed shaft [M].
16. Slide the tray feed roller shaft to the rear until it clears the front frame, and then slide off the front feed roller housing [N].
17. Remove the tray feed roller [O] by sliding the pick-up stay [P] to the front (1 E-ring and 1 bushing).

NOTE: a) As the tray feed roller has a one-way clutch, it is important to mount the roller correctly. The pick-up roller drive belt should be towards the front.

b) When replacing the cassette feed clutch bracket, secure it with the three screws, then slide the pick-up gear slightly to the front and align the sector gear and the pick-up gear as shown in the figure. (The marked tooth on the sector gear fits in between the marked teeth of the pick-up gear.)

4.5 CASSETTE FEED CLUTCH LUBRICATION



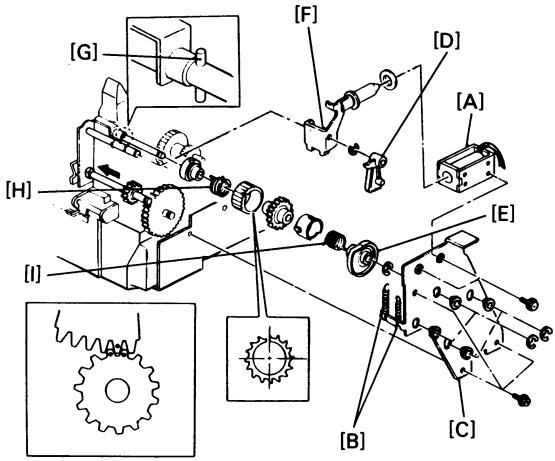
1. Turn off the main switch and unplug the copier.
2. Remove the upper rear cover, and the lower rear cover (2 screws each).
3. Remove the tray feed solenoid [A] (2 screws, 2 wire clamps).
4. Unhook the sector gear spring and the tray feed solenoid spring [B].
5. Remove the cassette feed clutch bracket [C] (3 screws, 4 E-rings, 4 bushings).
6. Remove the cassette feed roller gear [D], clutch sleeve [E], and clutch spring [F] and lubricate the clutch.

NOTE: a) The teeth of the clutch sleeve point in one direction. Take care not to install the sleeve incorrectly (see illustration).

b) When reinstalling the spring clutch, be sure to insert the projection of the clutch spring into the notch.

c) When reinstalling the cassette feed clutch bracket, secure the three screws, slide the pick-up gear to the front and align the sector gear and the pick-up gear. See illustration.)

4.6 PICK-UP AND TRAY FEED CLUTCH LUBRICATION



1. Turn off the main switch and unplug the copier.
2. Remove the upper rear cover, and the lower rear cover (2 screws each).
3. Remove the tray feed solenoid [A] (2 screws, 2 wire clamps).
4. Unhook the sector gear spring and the tray feed solenoid spring [B].
5. Remove the cassette feed clutch bracket [C] (3 screws, 4 E-rings, 4 bushings).
6. Remove the sector gear [D].
7. Remove the pick-up clutch cam [E] (1 E-ring).
8. Remove the clutch pawl assembly [F] (1 E-ring).

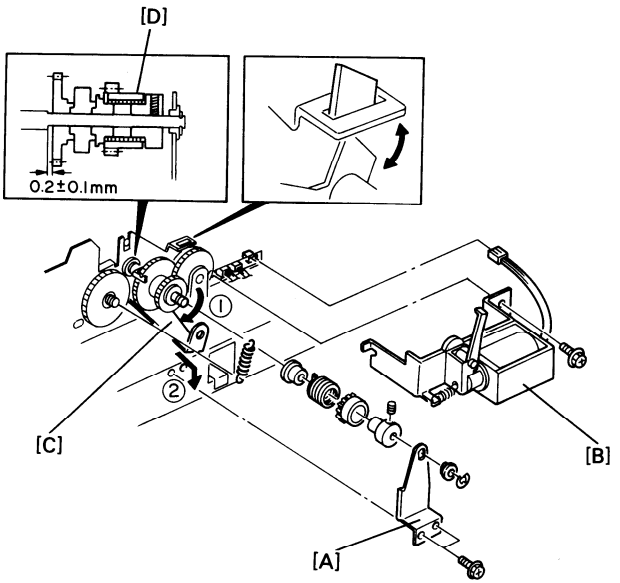
NOTE: Be careful not to loose the clutch drive pin [G].

9. Remove the clutch assembly, disassemble and lubricate the pick-up clutch [H], and tray feed clutch [1] with Mobil Temp. 78.

NOTE: a) When reinstalling the spring clutches, be sure to insert the projections of the clutch springs into the notches.

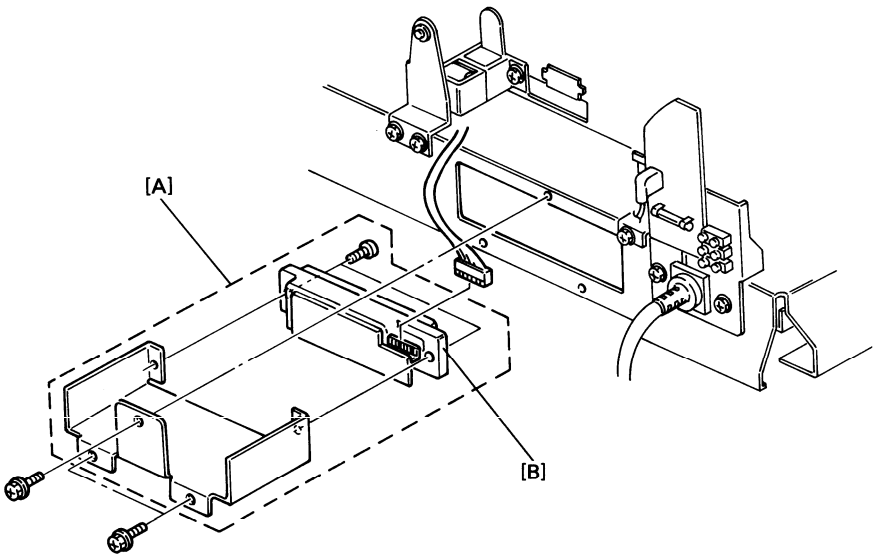
b) When reinstalling the cassette feed clutch bracket, secure the three screws, slide the pick-up gear to the front and align the sector gear and the pick-up gear. See illustration.)

4.7 REGISTRATION CLUTCH LUBRICATION



1. Turn off the main switch and unplug the copier.
2. Remove the upper rear cover (2 screws), and the lower rear cover (4 screws).
3. Remove the registration clutch bracket [A] (2 screws, 1 E-ring and 1 bushing).
4. Remove the registration solenoid assembly [B] (1 screw, 1 wire clamp).
5. Remove the registration clutch assembly with the engage gear bracket [C] (1 Spring, 1 Allen screw).
6. Disassemble and lubricate the registration clutch [D] with Mobil Temp. 78.
7. Reassemble and install the clutch so that the radial end of the spring and the gear side of the clutch sleeve are facing the registration roller.
8. Position a 0.2 mm thick gauge between the shaft shoulder and the idle gear (see illustration).
9. Push the registration clutch towards the registration roller and tighten the Allen screw.

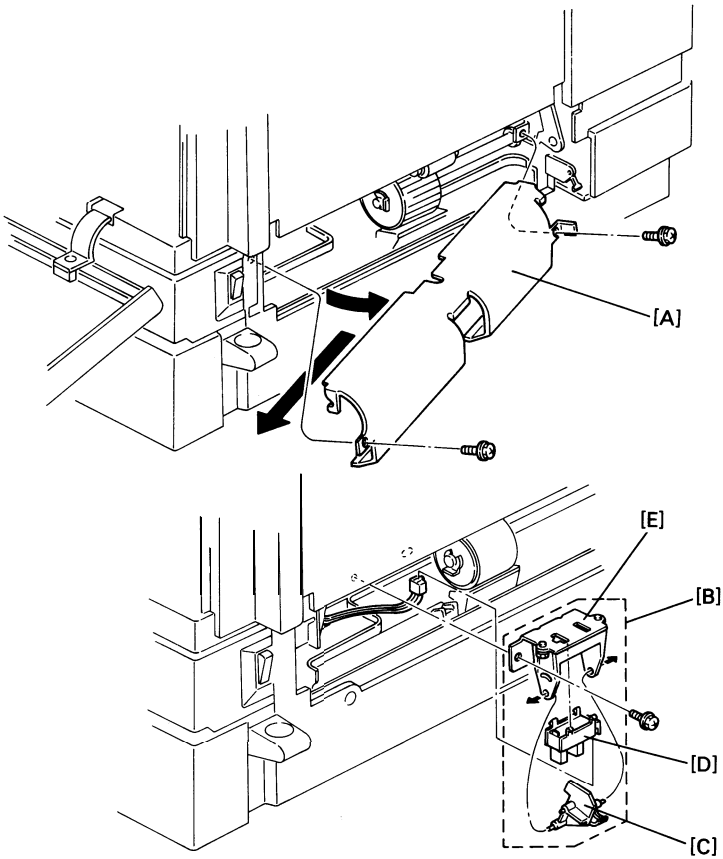
4.8 PAPER SIZE SWITCH REPLACEMENT



1. Turn off the main switch and unplug the copier.
2. Pull out the cassette tray.
3. Remove the upper rear cover (2 screws), and the lower rear cover (4 screws).
4. Remove the paper size switch together with the bracket [A] (3 screws).
5. Remove the paper size switch [B] from the bracket (2 screws and 1 connector).

NOTE: When installing the paper size switch in the bracket, be sure that the connector faces the upper right hand side, as shown in the figure.

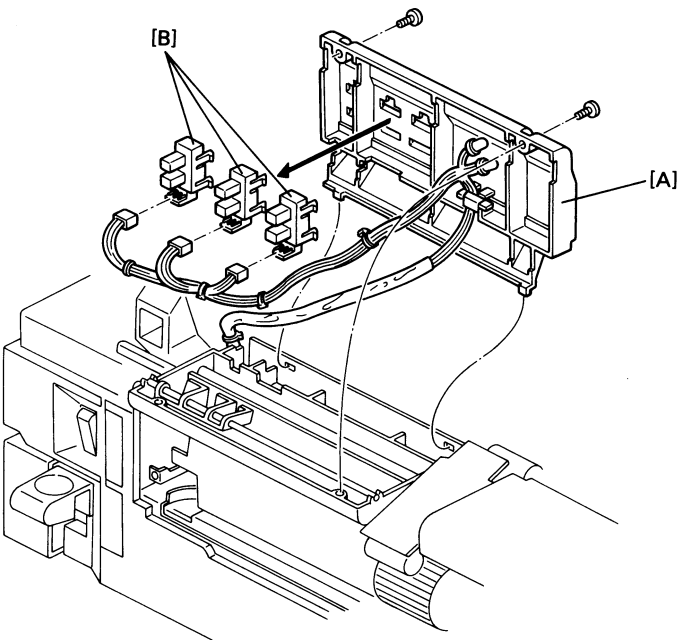
4.9 PAPER END SENSOR REPLACEMENT



1. **Remove the paper tray.**
2. **Remove the paper turn guide [A] (2 screws).**
3. **Remove the paper end sensor unit [B] (1 screw, 1 connector).**
4. **Remove the paper end sensor actuator [C] by flexing the paper end sensor bracket gently.**
5. **Separate the paper end sensor [D] from the bracket [E], and replace it.**

NOTE: When reassembling, make sure that the paper end sensor unit is seated correctly.

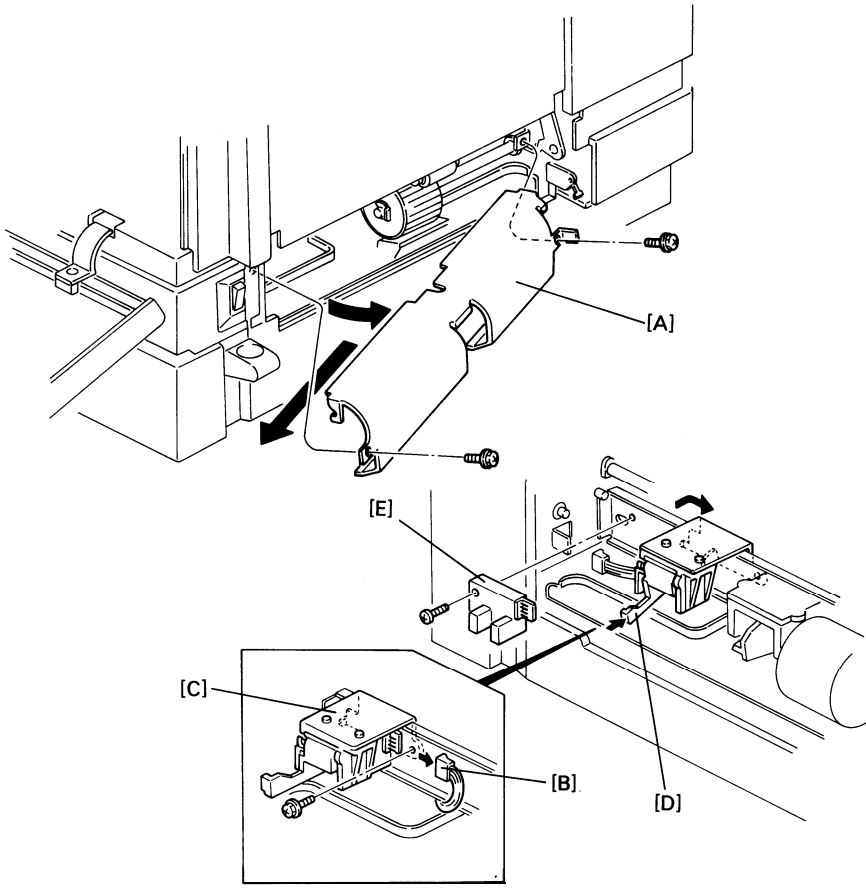
4.10 PAPER WIDTH SENSOR REPLACEMENT



1. **Open the clamshell.**
2. **Remove the development unit.**
3. **Remove the width sensor cover [A] (2 screws).**
4. **Replace the paper width sensors [B] (1 connector each).**

NOTE: When reinstalling the width sensor cover, first insert the positioning tabs into the positioning notches.

4.11 PAPER LENGTH SENSOR REPLACEMENT

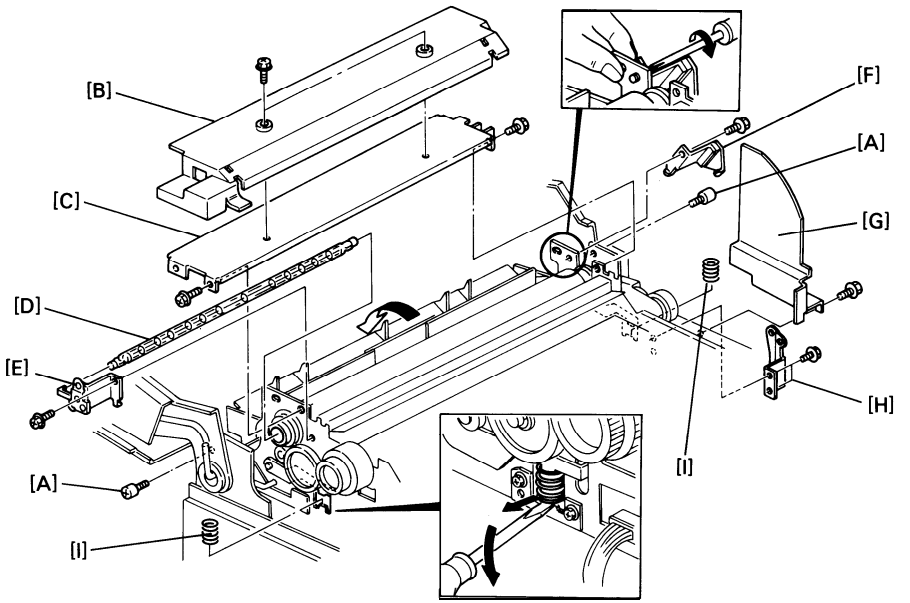


1. **Remove the paper tray.**
2. **Remove the paper turn guide [A] (2 screws).**
3. **Disconnect the length sensor connector [B].**
4. **Remove the screw securing the length sensor bracket [C].**
5. **While pushing in the length sensor interrupter [D], slide the length sensor bracket to the right.**
6. **Replace the paper length sensor [E] (1 screw).**

5. FUSING UNIT

5.1 HOT ROLLER REPLACEMENT

WARNING: The fusing unit may be hot. Allow it to cool down before performing the following procedures.



1. **Turn off the main switch and unplug the copier.**
2. **Open the exit assembly (see Hot Roller Strippers Replacement section).**
3. **Open the clamshell and remove the master unit.**
4. **Remove the following parts:**

a)	Platen cover	
b)	Upper rear cover	(2 screws)
c)	Lower rear cover	(4 screws)
d)	Front cover	(2 screws).

CAUTION: To prevent the scanner from sliding down and becoming damaged, make sure it is in the home position before starting the next step.

5. Open the clamshell, remove the two stopper screws [A], and stand it in the straight up position.
6. Remove the fusing unit cover [B] (2 screws).
7. Remove the fusing stay [C] (4 screws).

NOTE: Lower the clamshell when removing the left rear screw.

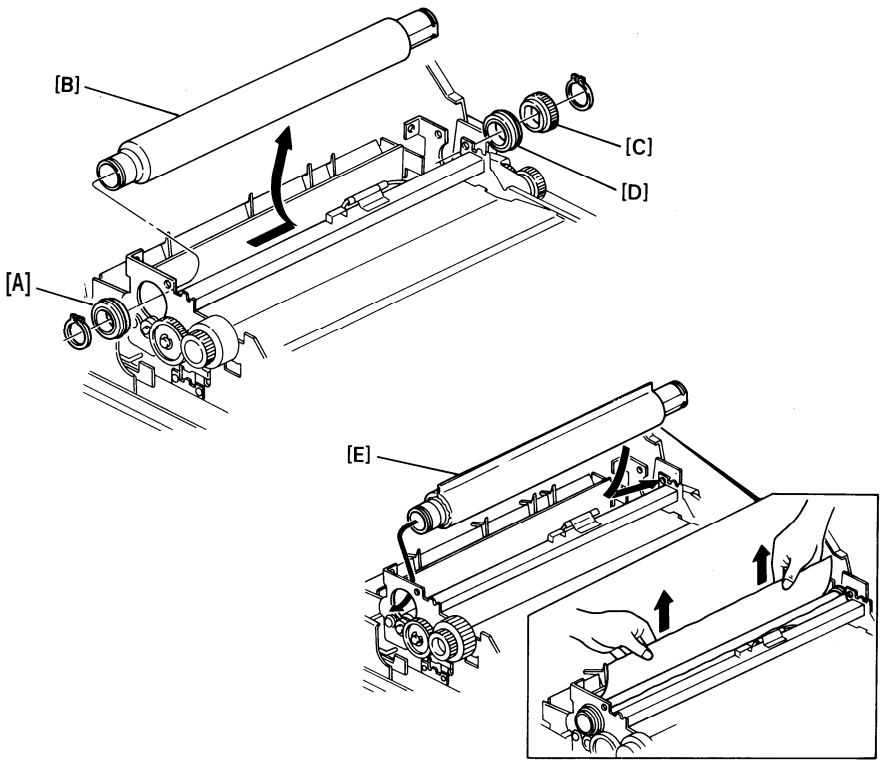
8. Holding the front end of the fusing lamp [D], remove the front terminal bracket [E] (1 screw).
9. Pull out the fusing lamp gently.

CAUTION: To prevent the rear hot roller bearing from becoming dislocated, hold the rear fusing bracket when performing the next step.

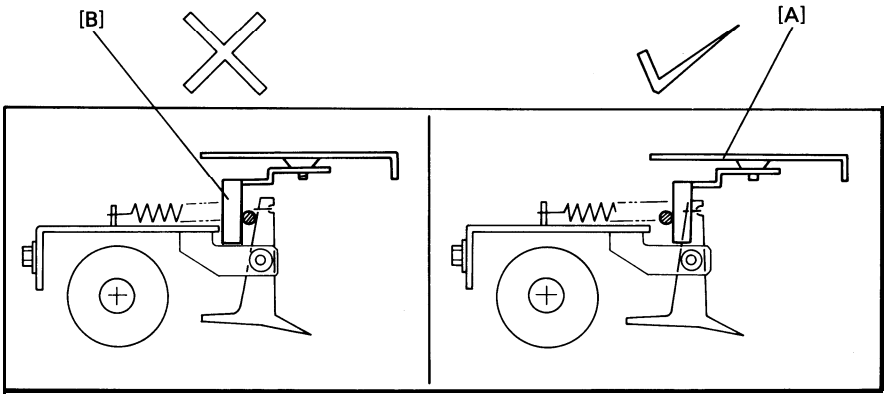
10. Remove the rear terminal bracket [F] (1 screw).
11. Remove the safety cover [G] (1 screw) and the fusing drive bracket [H] (2 screws).

CAUTION: Remove the springs carefully as they have high tension.

12. Remove the front and rear pressure springs [I].



13. Remove the bearing [A] from the front end of the hot roller [B] (1 C- ring).
14. Remove the fusing gear [C] (1 C-ring).
15. Slide the hot roller to the front and remove the rear bearing [D].
16. Carefully remove the hot roller.
17. Tear off the ends of the protective paper [E] from the new hot roller and install it.
18. After installation of the hot roller, bearings and gears, remove the protective paper.
19. Reinstall the pressure springs, making sure they are mounted in the pressure lever correctly.



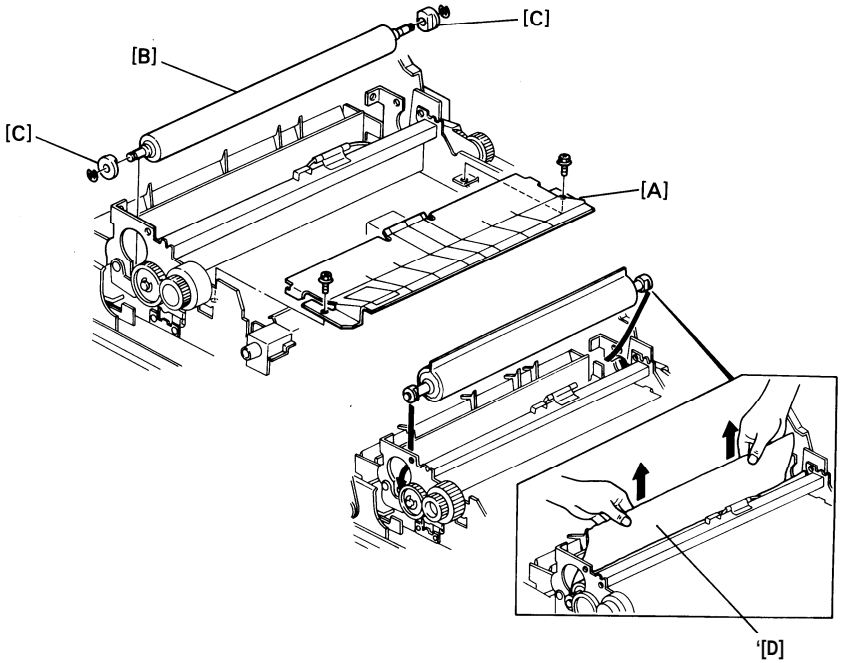
CAUTION: When installing the fusing stay [A], the exit assembly must be open, otherwise the stripper pawl setting plate [B] locks the exit assembly.

20. Assemble the copier.

NOTE: When installing the fusing lamp, make sure both ends of the fusing lamp properly contact the terminals.

WARNING: Make sure the clamshell stopper screws are replaced after completing this procedure.

5.2 PRESSURE ROLLER REPLACEMENT

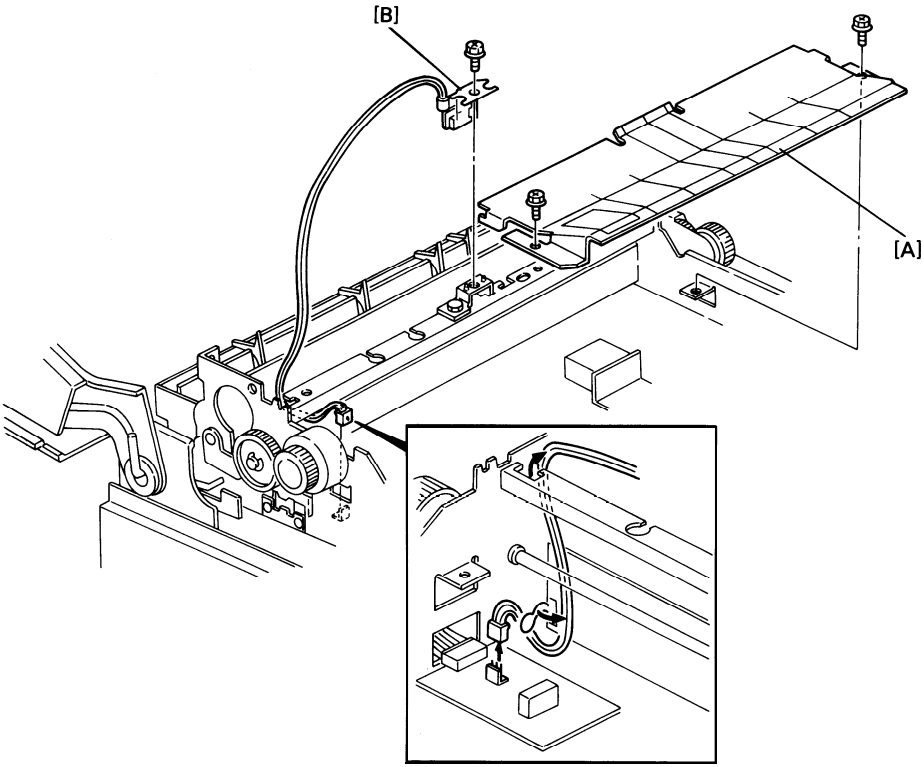


1. Turn off the main switch and unplug the copier.
2. Remove the hot roller (see Hot Roller Replacement section).
3. Remove the transport guide plate [A] (2 screws).
4. Lift out the pressure roller [B].
5. Remove the front and rear bushings [C] (1 E-ring each).
6. Install the new pressure roller, and remove the protective paper [D].
7. Assemble the copier.

CAUTION: When installing the fusing stay, the exit assembly must be open, otherwise the stripper pawl setting plate locks the exit assembly.

WARNING: Make sure the clamshell stopper screws are replaced after completing this procedure.

5.3 THERMISTOR REPWCEMENT

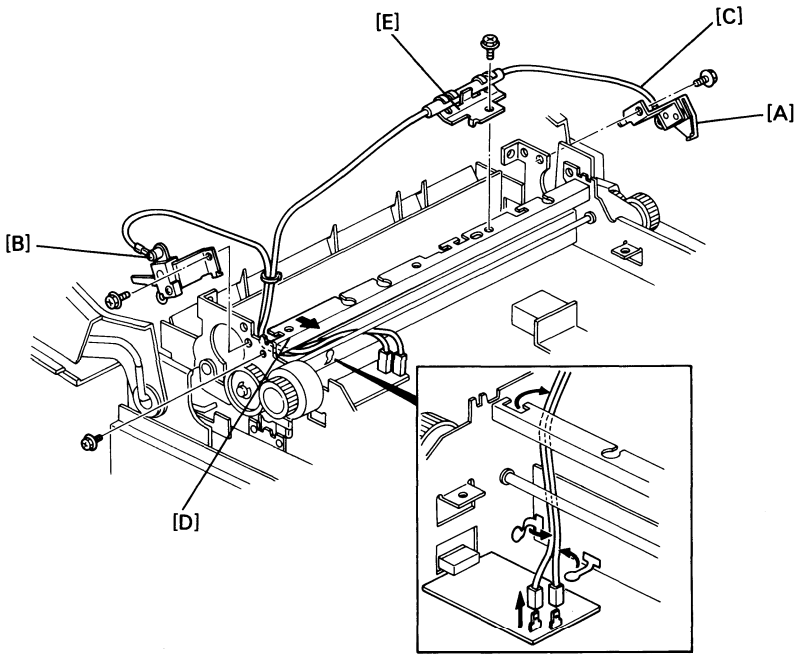


1. Turn off the main switch and unplug the copier.
2. Remove the fusing stay (see Hot Roller Replacement section).
3. Remove the transport guide plate [A] (2 screws).
4. Remove the thermistor [B] (1 screw, 1 connector).

CAUTION: When installing the fusing stay, the exit assembly must be open, otherwise the stripper pawl setting plate locks the exit assembly.

5. Assemble the copier;

5.4 THERMOFUSE REPLACEMENT



1. Turn off the main switch and unplug the copier.
2. Remove the transport guide plate (see Thermistor Replacement section).

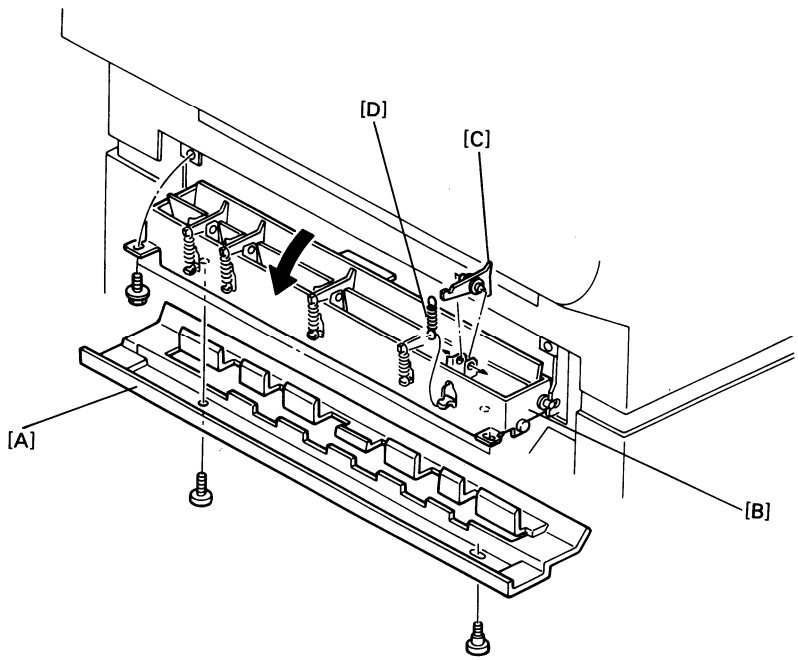
CAUTION: When removing the rear fusing lamp terminal, be careful not to damage the fusing lamp.

3. Remove the rear fusing lamp terminal [A] (1 screw).
4. Remove the thermofuse harness from the front [B] and rear [C] fusing lamp terminals (1 screw each).
5. Remove the screw securing the front end of the thermofuse stay [D], and move it slightly out of the way.
6. Remove the thermofuse [E] (1 screw, 2 terminals).

CAUTION: When installing the fusing stay, the exit assembly must be open, otherwise the stripper pawl setting plate locks the exit assembly.

7. Assemble the copier.

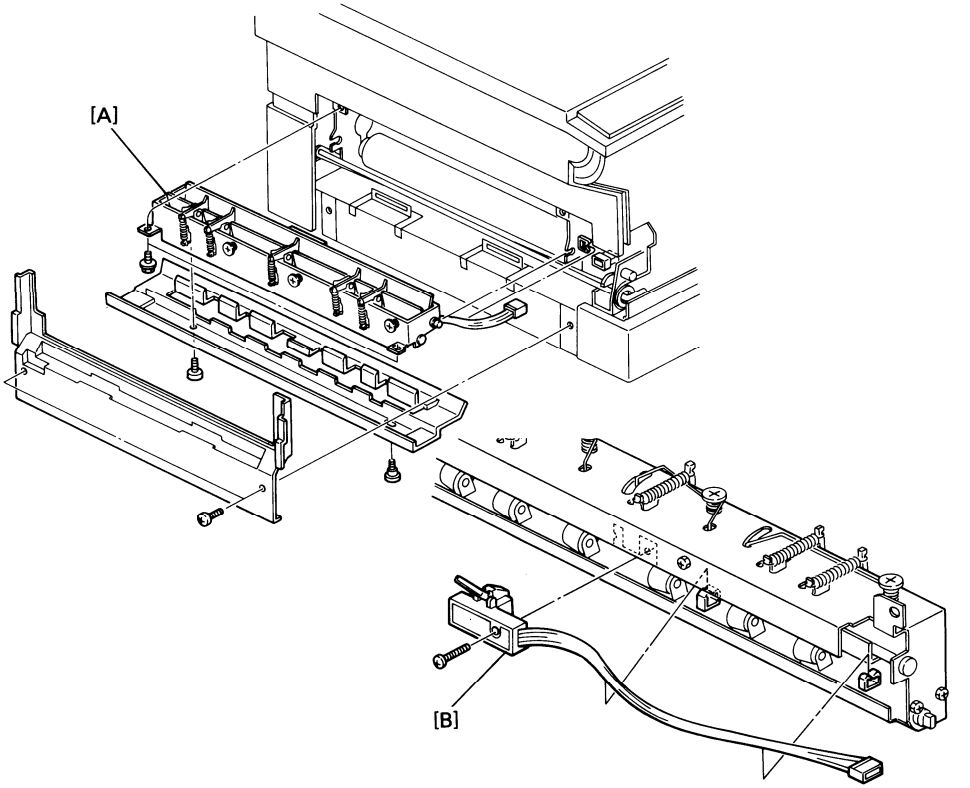
5.5 HOT ROLLER STRIPPERS REPLACEMENT



1. Remove the exit cover [A] (2 screws).
2. Open the exit assembly [B] (2 screws).
3. Remove the hot roller strippers [C] together with the springs [D]

NOTE: It is recommended to replace the hot roller strippers as a set.

5.6 EXIT SENSOR REPLACEMENT



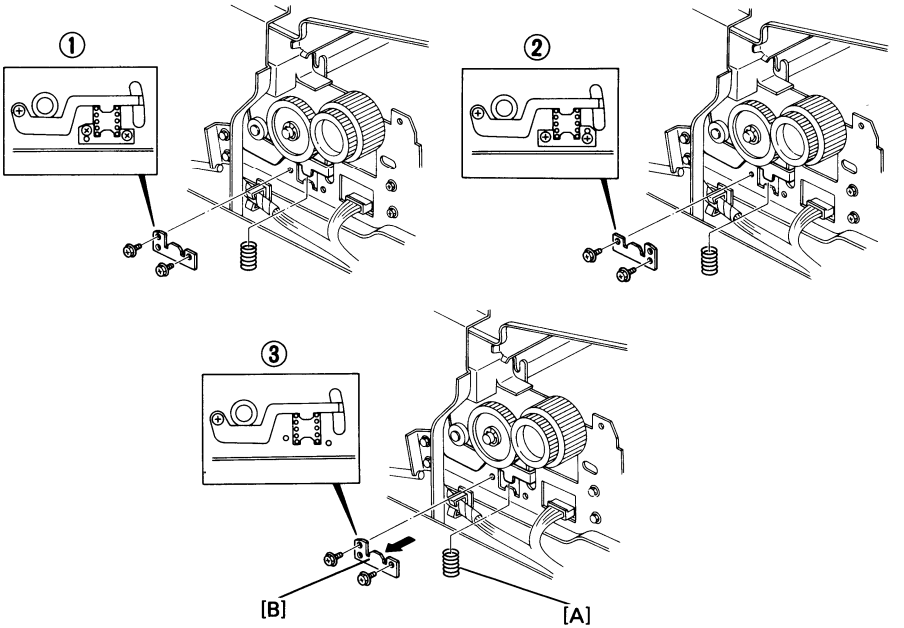
1. Turn off the main switch and unplug the copier.
2. Remove the following parts:

a)	Front cover	(2 screws)
b)	Upper rear cover	(2 screws)
c)	Lower rear cover	(4 screws)
d)	Exit cover	(2 screws)
e)	Lower left cover	(2 screws),

3. Remove the exit assembly [A] (2 screws, 2 wire clamps, 1 connector).
4. Remove the exit sensor [B] (1 screw, 2 wire clamps).

NOTE: When removing and reinstalling the exit sensor, take care not to damage the sensor feeler.

5.7 FUSING PRESSURE ADJUSTMENT



1. Turn off the main switch and unplug the copier.
2. Remove the following parts:

   a) Front cover (2 screws)
   b) Upper rear cover (2 screws)
   c) Lower rear cover (4 screws).

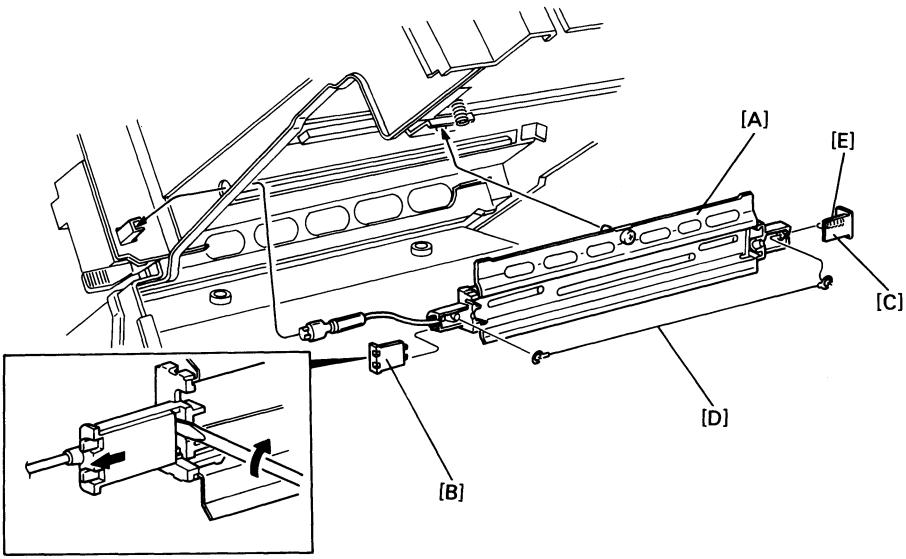
3. Remove the fusing drive bracket. (See Hot Roller Replacement section.)
4. Remove the pressure springs [A].
5. Remove the front and rear adjustment plates [B] (2 screws each) and set them according to the required pressure amount:

Setting	Fusing Pressure	
1	22Kg	(Factory setting)
2	30Kg	
3	15 Kg.	

NOTE: Make sure both plates are in the same position otherwise uneven fusing will occur.

6. CORONAS

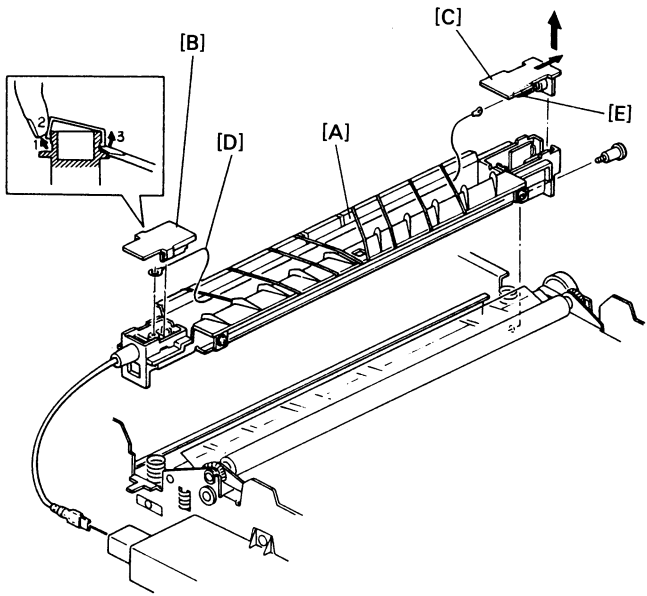
6.1 CHARGE CORONA WIRE REPLACEMENT



1. Open the clamshell and remove the master unit.
2. Remove the charge corona unit [A] (1 screw, 1 plug).
3. Remove the front endblock cover [B] by sliding it off gently.
4. Remove the rear endblock cover [C] by sliding it off gently together with the charge corona wire [D].
5. Remove the charge corona wire from the tension spring [E] and front endblock.

NOTE: Check the action of the tension spring after installation.

6.2 TRANSFER CORONA WIRE REPLACEMENT

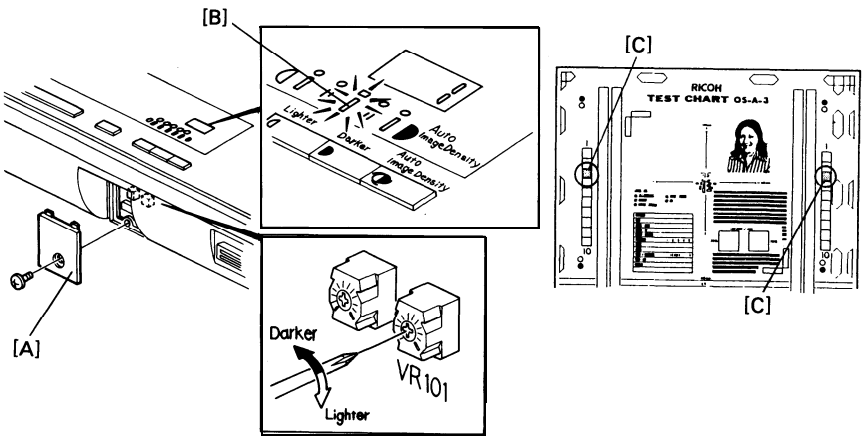


1. **Open the clamshell and remove both the lower rear cover and front cover.**
2. **Remove the transfer corona unit [A] (1 screw, 1 plug).**
3. **Gently remove the front endblock cover [B].**
4. **Slide the rear endblock cover [C] to the rear and then remove it together with the transfer corona wire [D] .**
5. **Remove the transfer corona wire from the tension spring [E].**

NOTE: Check the action of the tension spring after installation.

7. COPY IMAGE

7.1 LIGHT INTENSITY ADJUSTMENT

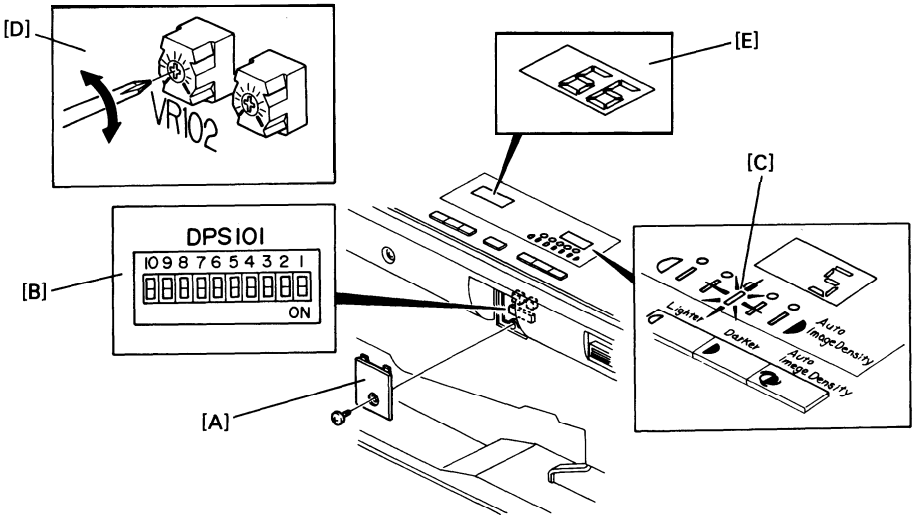


ADJUSTMENT STANDARD : When the copier is set at the 3rd image density level (middle setting), level 3 of the gray scale on the copy should be slightly visible but level 2 should be invisible. If the light intensity is not correct, adjust it as follows:

1. Turn off the main switch.
2. Clean the optics (mirrors, lens, reflectors, and exposure glass).
3. Reassemble.
4. Open the front cover and remove the DIP switch cover [A] (1 screw).
5. Close the front cover and turn on the main switch.
6. Select the 3rd image density level [B].
7. Make a few copies of the OS-A3 chart.
8. Adjust the light intensity by rotating VR101 so that level 3 of the gray scale [C] is slightly visible on the copy.

NOTE: During this adjustment, all covers must be on the copier.

7.2 AUTO ID SENSOR ADJUSTMENT



ADJUSTMENT STANDARD : 2.0 V ±0.05 V

PREPARATION:

1. Adjust the light intensity first (see Light intensity Adjustment section).
2. Turn off the main switch.
3. Lay three sheets of white copy paper on the exposure glass and close the platen cover.

METHOD A: Reading from the CPU

4. Open the front cover and remove the DIP switch cover [A] (1 screw).
5. Turn on DPS101-4 (Test Mode) on the main PCB [B].
6. Activate the front cover safety switch and turn on the main switch.
7. Enter "5" via the number keys and press the Start key.

NOTE: a) The scanner automatically moves 10 cm away from the left scale, and the exposure lamp turns on.

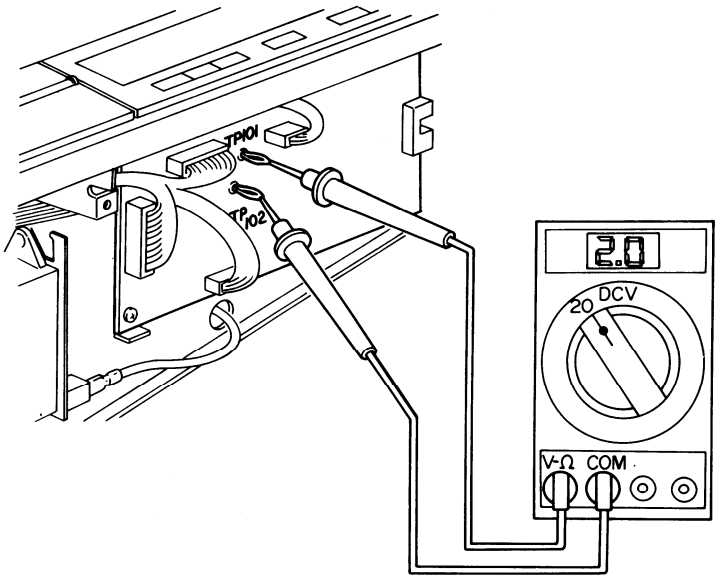
b) Confirm that the 3rd image density level is selected automatically [C].

8. Wait for a few seconds until the light intensity instable.

WARNING: The exposure lamp turns off automatically after being on for 20 seconds – for safety purposes. If the adjustment is not completed within 20 seconds, wait until the exposure glass cools down. Then, perform the adjustment again.

9. Adjust VR102 [D] until a hexadecimal number (base 16) between 64 and 68 is displayed in the Reproduction Ratio indicator [E].

NOTE: To turn off the exposure lamp, press the C/S key.



METHOD B: Reading from a digital multimeter

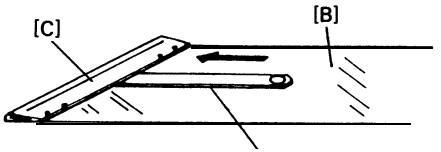
10. Open the clamshell and remove the inner cover(1 E-ring, 5screws).

11. Hook up the multimeter leads as follows:

a) positive lead to TP101 on the main PCB
b) negative lead to TP102 (GND) on the main PCB.

12. Repeat steps "5" to "9", noting the reading in the multimeter until a value of 2.0 ± 0.05 volts is achieved.

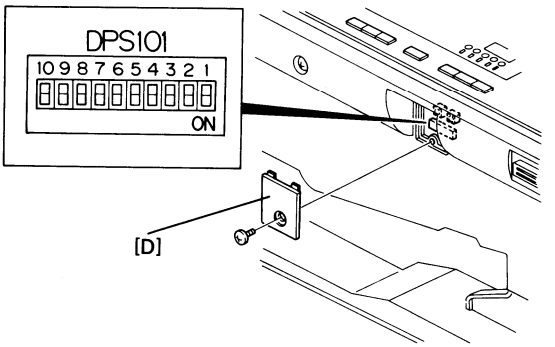
7.3 LEADING EDGE REGISTRATION ADJUSTMENT



– Leading Edge Registration –

1 : SW ON 0 : SW OFF

No.1	No.2	NO.3	Registration
0	0	0	Decrease (–)
1	0	0	
0	1	0	
1	1	0	Variation per step: Approx 1.3mm (0.051")
0	0	1	
1	0	1	
0	1	1	
1	1	1	Increase (+)



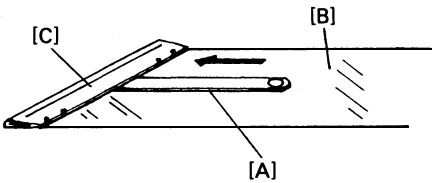
ADJUSTMENT STANDARD: 0 ±2.0 mm (0 ±0.08"

1. Lay a scale [A] on the exposure glass [B], aligning it with the left scale [C] as shown in the illustration.
2. Make a few copies and check that the leading edge registration is within standard.

NOTE: Leading edge registration is the distance the image has shifted on the copy.

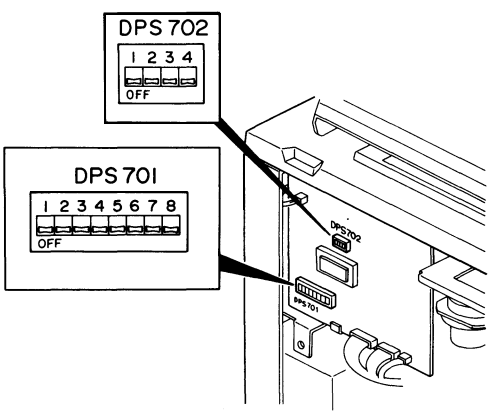
3. If the registration is out of standard, remove the DIP switch cover [D] (1 screw) and adjust the registration using DPS101-1, 2, and 3 on the main PCB.

7.4 LEADING EDGE ERASE ADJUSTMENT



1: SW ON 0: SW OFF

No. 2	No. 3	No. 4	Erase
0	0	0	Decrease (–)
0	0	1	
0	1	0	Variation
0	1	1	per step:
1	0	0	Approx. 0.8 mm
1	0	1	(0.032")
1	1	0	
1	1	1	Increase (+)



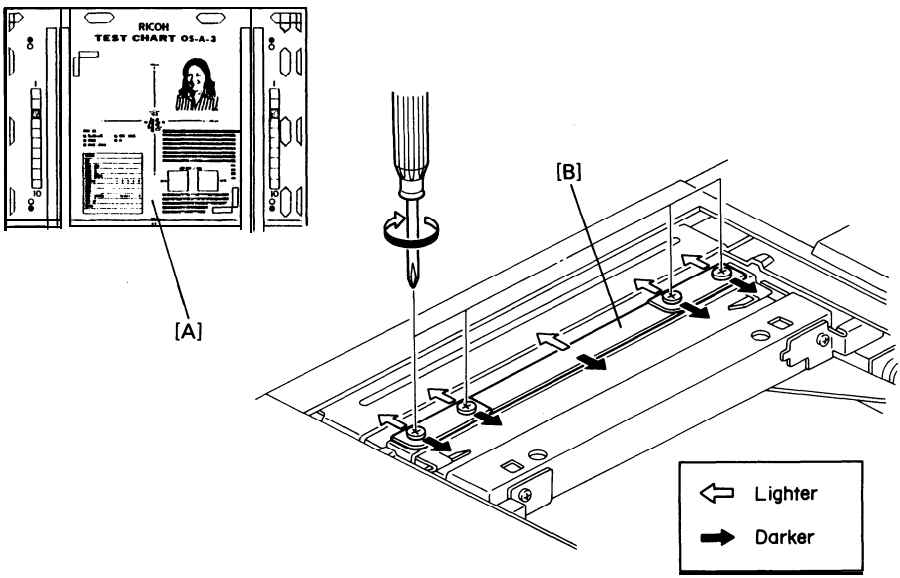
ADJUSTMENT STANDARD: **3.5 ± 1mm (0.14 ± 0.04")**

1. Adjust the leading edge registration first (see Leading Edge Registration Adjustment section).
2. Lay a scale [A] on the exposure glass [B] , aligning it with the left scale [C] as shown in the illustration.
3. Make a few copies and check that the leading edge erase is within standard.

NOTE: Leading edge erase is the amount on the scale that has been erased.

3. If the leading edge erase is out of standard, remove the upper rear cover and adjust it using DPS701-2, 3, and 4 on the optics board.

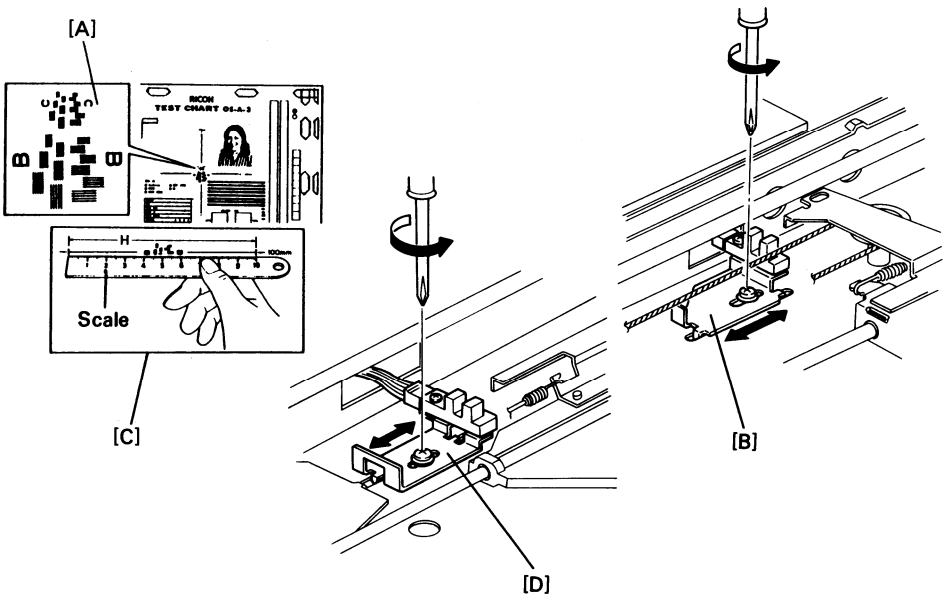
7.5 UNEVEN IMAGE DENSITY ADJUSTMENT (uneven exposure)



Side-to-Side Image Density Standard: Within one level difference between the two gray scales on either side-of the OS-A3 test chart.

1. **Adjust the exposure lamp position (see Exposure Lamp Positioning section).**
2. **Make a few copies of the OS-A3 chart [A] and check the difference in the image density between both sides of the copy.**
3. **If side-to-side image density is out of standard, remove the exposure glass (2 screws), and adjust it using the uneven density adjusting plates [B].**

7.6 HORIZONTAL MAGNIFICATION ADJUSTMENT



7.6.1 - Resolution Adjustment -

1. Make a few copies of the OS-A3 chart using the 1 :1 reproduction ratio and check the resolution [A].
2. If the resolution is poor, remove the lens cover (2 screws), and adjust the position of the mirror position sensor [B] to achieve an optimum image sharpness.

7.6.2 - Horizontal Magnification Adjustment -

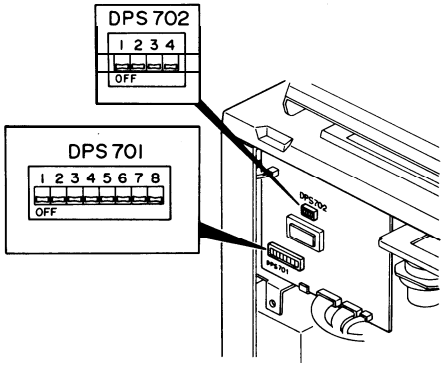
Horizontal Magnification Standard: 100 ± 0.5mm (±0.5%)

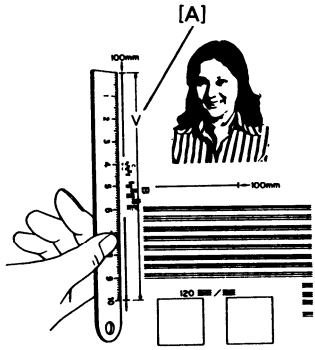
NOTE: Check/adjust the resolution before commencing this procedure.

3. Make a few copies of the OS-A3 chart using the 1:1 reproduction ratio and check that the horizontal magnification [C] is within specification.
4. If the horizontal magnification is out standard, adjust the lens home position sensor [D].

NOTE: Moving the sensor to the left decreases the image size.
Moving the sensor to the right increases the image size.

7.7 VERTICAL MAGNIFICATION ADJUSTMENT





DIP SW 701

1: SW ON 0: SW OFF (Fine Adjustment)

5	6	7	8	
0	0	0	0	Faster (Smaller)
0	0	0	1	
0	0	1	0	
0	0	1	1	
0	1	0	0	
0	1	0	1	
0	1	1	0	Variation per step: Approx. 0.2%
0	1	1	1	
1	0	0	0	
1	0	0	1	
1	0	1	0	
1	0	1	1	
1	1	0	0	
1	1	0	1	
1	1	1	0	
1	1	1	1	Slower (Larger)

DIP SW 702

1: ON 0: OFF (Rough Adjustment)

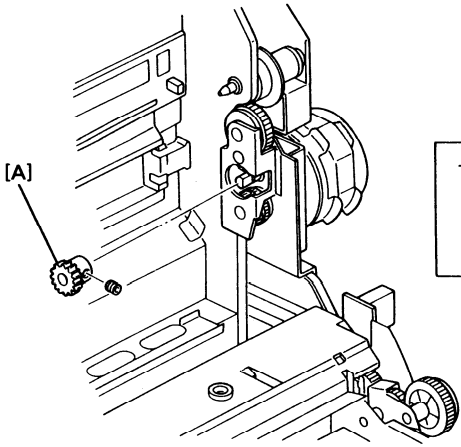
1	2	3	4	
1	2	3	4	Faster (Smaller)
0	0	1	1	
0	0	1	0	Variation per step: Approx. 1.4%
0	0	0	0	
0	1	0	0	
1	0	0	0	Slower (Larger)

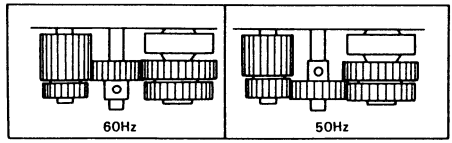
Vertical Magnification Standard: 100 ± 1.0mm (±1%)

1. Make a few copies of OS-A3 chart using the 1:1 reproduction ratio and check that the vertical magnification [A] is within standard.
2. If the vertical magnification is out of standard, remove the upper rear cover (2 screws) and adjust it using DPS702-1, 2, 3, 4 (rough adjustment), and DPS701 -5, 6, 7, 8 (fine adjustment) on the optics board.

8. OTHERS

8.1 50 Hz/60 Hz CONVERSION





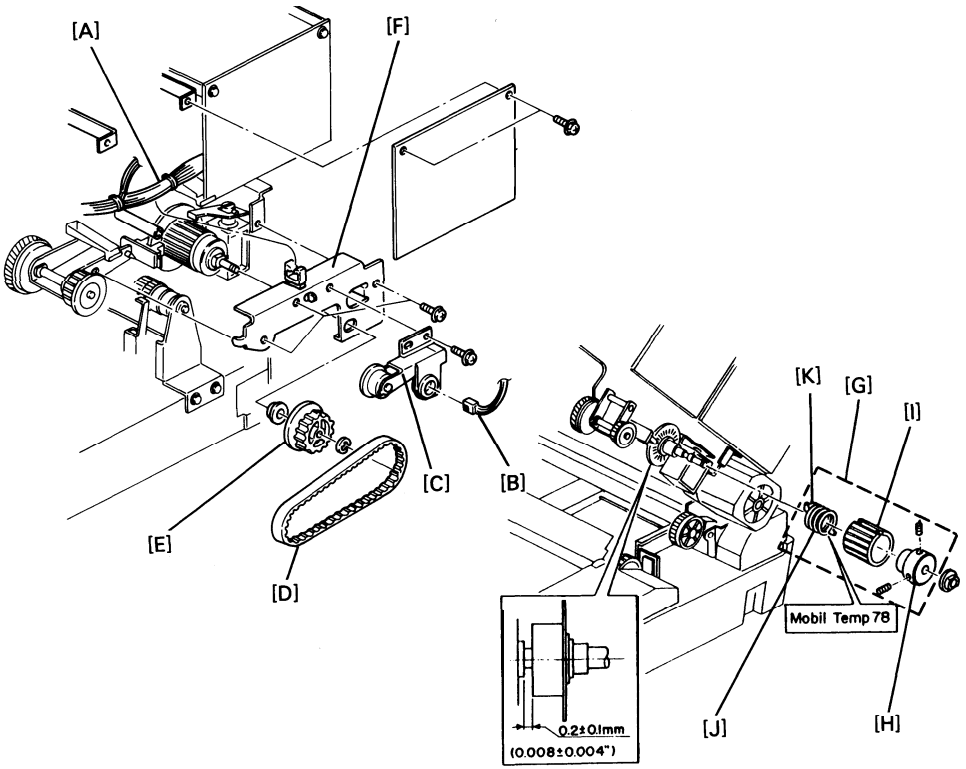
1. **Turn off the main switch and unplug the copier.**
2. **Open the clamshell and remove the master unit.**
3. **Remove the following parts:**

   a) Platen cover
   b) Front cover (2 screws)
   c) Upper rear cover (2 screws)
   d) Lower rear cover (4 screws).

4. **Remove the 2 clamshell stopper screws and stand the clamshell straight up.**
5. **Remove the main motor gear [A] (part no. 52205870:50 Hz or 52205871: 60 Hz) (1 Allen screw) and set it according to the desired electrical frequency as shown in the illustration.**

WARNING: Make sure the clamshell stopper screws are replaced after completing this procedure.

8.2 MASTER CLUTCH LUBRCATION

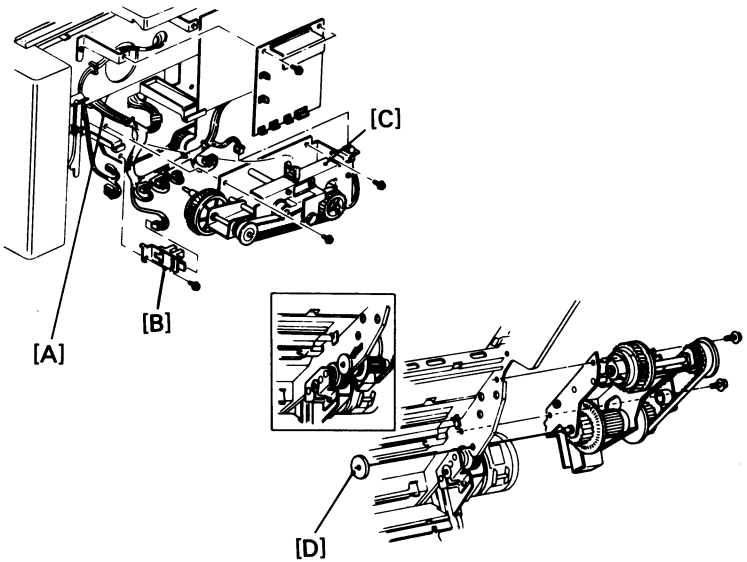


1. **Remove the upper rear cover (2 screws).**
2. **Open the clamshell.**
3. **Remove the harness from the harness clamp [A].**
4. **Remove the pulse generator sensor connector [B].**
5. **Remove the timing belt tensioner [C] (1 screw) and the timing belt [D].**
6. **Remove the master/development drive pulley [E] (1 E-ring).**
7. **Remove the master clutch bracket [F] (3 screws, 1 bushing).**
8. **Remove the 2 Allen screws from the master clutch [G].**
9. **Rotate the output hub [H] counterclockwise and remove it.**

NOTE: Do not pull the hub straight out as this may damage the spring.

10. Remove the master clutch sleeve [I].
11. Rotate the clutch spring [J] counterclockwise and remove it.
12. Apply Mobil Temp. 78 to the clutch.
13. Re-install the clutch so that the radial end [K] of the spring and the smooth side of the clutch sleeve are facing the pulse generator gear.
14. Position a 0.2 mm (0.008") thickness gauge between the pulse generator gear and bushing.
15. Push the master clutch towards the pulse generator gear and tighten both Allen screws.

8.3 MASTER DRIVE ASSEMBLY REPLACEMENT



8.3.1 Master Drive Assembly Removal

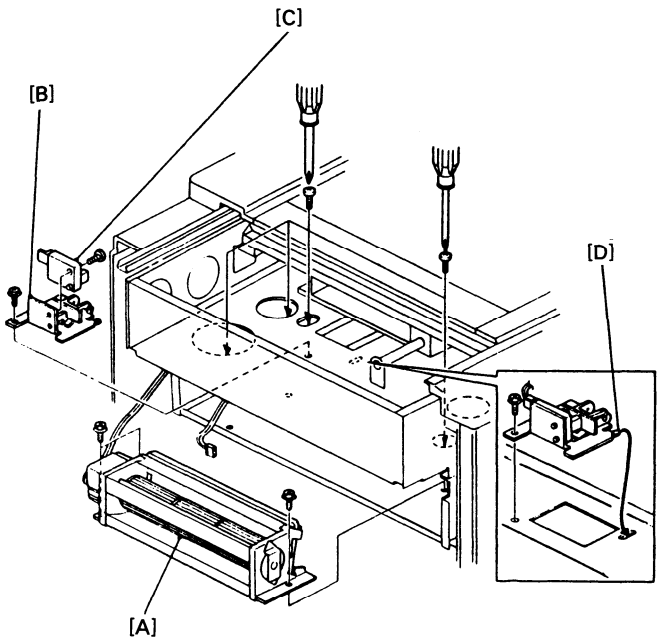
1. Remove the upper rear cover (2 screws).
2. Open the clamshell and remove the master unit.
3. Remove the harness [A] from the harness clamp.
4. Remove the pulse generator sensor assembly [B] (1 screw, 1 connector).
5. Remove the master drive assembly. [C] (3 screws, 1 connector).

8.3.2 Master Drive Assembly Positioning

When reinstalling the master drive assembly, the following procedure is necessary:

6. Place the positioning ring [D] (part number 52169003) on the pulse generator shaft.
7. Apply pressure to the slider drive assembly forcing it in the direction of the main motor, then tighten the screws. (This is to make sure that the drive relay gear collar is set correctly.)
8. Remove the positioning ring from the shaft.

8.4 TONER OVERFLOW SENSOR REPLACEMENT



NOTE: Make sure that the copier is in the full size mode (1 : 1) before starting the following procedure.

1. Remove the upper left cover (4 screws) and the upper rear cover (2 screws).
2. Remove the exhaust blower [A] (3 screws, 1 connector, 1 wire clamp).
3. Remove the toner overflow sensor assembly [B] (1 screw, 1 connector).
4. Remove the toner overflow sensor [C] from the bracket (1 screw).

NOTE: When installing the toner overflow assembly, make sure that the positioning tab is seated correctly [D] .

SECTION 6

TROUBLESHOOTING

1. COPY QUALITY

1.1 UNEVEN IMAGE DENSITY

CAUSE	ACTION
(1) Charge corona wire is dirty.	(1) Clean it with the cleaner.
(2) Charge corona wire is mounted incorrectly.	(2) Check that the wire is in the V-slot.
(3) Quenching lamp is dirty.	(3) Clean it with a soft cloth.
(4) Reflector is dirty.	(4) Clean it with a soft cloth.
(5) Exposure lamp is dirty.	(5) Clean it with a soft cloth.
(6) Mirrors/Lens are dirty.	(6) Clean them with a soft cloth. Correct uneven density using the adjusting plates.
(7) Exposure lamp position incorrect.	(7) Adjust the exposure lamp position.

1.2 WHITE LINES OR STREAKS

CAUSE	ACTION
(1) Toner blocking on the toner metering blade.	(1) Clean the blade with the toner agitator.
(2) Insufficient toner in the development unit.	(2) Replenish one toner cartridge and agitate the metering blade with the toner agitator.
(3) Grid plate is dirty.	(3) Clean it with a blower brush.
(4) Charge corona wire is dirty.	(4) Clean it with the cleaner.
(5) Mirrors/Lens are dirty.	(5) Clean them with a soft cloth.

1.3 FUZZY COPY

CAUSE	ACTION
(1) Original is not flat on the exposure glass.	(1) Instruct the operator to correct original curl.
(2) Exposure glass is dirty.	(2) Clean it with a soft cloth.
(3) Mirrors/Lens are dirty.	(3) Clean them with a soft cloth.

1.4 DIRTY BACKGROUND

CAUSE	ACTION
(1) Light fatigue of the master unit.	(1) Avoid exposing the master unit to light. (Do not leave the machine with the upper clamshell opened for a long time.)
(2) Exposure glass is dirty.	(2) Clean it with a soft cloth.
(3) Platen cover sheet is dirty.	(3) Clean it with a damp cloth.
(4) Bias circuit failure.	(4) Check the circuit and replace the defective part.
(5) Quenching lamp failure.	(5) Check the circuit and replace the defective part.
(6) Mirrors/Lens are dirty.	(6) Clean them with a soft cloth.
(7) Weak light intensity.	(7) Adjust exposure lamp output using VR101 on the main board.

1.5 DIRTY BACKSIDE OR LEADING EDGE

CAUSE	ACTION
(1) Lower feed guide is dirty.	(1) Clean it with a damp cloth.
(2) Transfer corona unit is dirty.	(2) Same as (1)
(3) Transport guide plate is dirty.	(3) Same as (1)
(4) Registration rollers are dirty.	(4) Clean them with a soft cloth.

1.6 BLANK AREAS

CAUSE	ACTION
(1) Paper is damp.	(1) Change the paper in the cassette/ paper tray. (Instruct the operator how to store paper when is not to be used for a long time.)
(2) Paper is curled.	(2) Correct the paper curl. (Instruct the operator how to correct the curl.)

1.7 INSUFFICIENT IMAGE DENSITY

CAUSE	ACTION
(1) Transfer corona wire is dirty.	(1) Clean it with cotton swabs.
(2) Transfer corona wire is broken.	(2) Replace the transfer corona wire.

(3) Transfer power pack failure.	(3) Check the circuit and replace the defective part.
(4) Master unit has exceeded service life.	(4) Replace the master unit.
(5) Paper is damp.	(5) Change the paper in the cassette/ paper tray.
(6) Development roller does not rotate.	(6) Check the drive mechanism.

1.8 WHITE COPY

CAUSE	ACTION
(1) Charge corona wire is broken.	(1) Replace the charge corona wire.
(2) Charge power pack failure.	(2) Check the circuit and replace the defective part with a new one.

1.9 FAINT COPY AT LEADING OR TRAILING EDGE

CAUSE	ACTION
(1) Paper is curled.	(1) Correct the paper curl before making copies.
(2) Paper is damp.	(2) Change the paper in the cassette/ paper tray. . Instruct the operator how to store paper when it is not to be used for a long time. . Thick and/or thin paper sometimes yields faint copies due to paper quality. . Instruct the operator to use recommended paper.

1.10 WRINKLED COPY

CAUSE	ACTION
(1) Paper is curled.	(1) Correct the paper curl.
(2) Paper is damp.	(2) Change the paper in the cassette.

1.11 BLACK LINES

CAUSE	ACTION
(1) Thermistor is dirty.	(1) Clean it with a damp cloth.
(2) Hot roller strippers are dirty.	(2) Clean them with a damp cloth.
(3) Deformed toner metering blade.	(3) Replace the blade with a new one.

1.12 JITTER

CAUSE	ACTION
(1) The scanner guide rod is dirty.	(1) Clean the guide rod then apply a small amount of launa oil to the lubricant pad.
(2) The scanner wire is not correctly tensioned.	(2) Check and replace the tension spring together with the scanner drive wire.
(3) The master belt does not rotate smoothly.	(3) Check and repair the master drive mechanism.

2. SERVICE CALL CONDITIONS

2.1 E1 EXPOSURE

<E12>

- Definition -

1. **Lights if the feedback signal becomes higher than 4.2 volts or less than 0.5 volt when the exposure lamp is on.**

2. **Lights if the feedback signal becomes higher than 1 volt when the exposure lamp should be off.**

- Possible causes -

1. **Exposure lamp open**
2. **Thermoswitch open**
3. **AC drive board defective**
4. **Main board defective**

- Action -

Does the exposure lamp turn on?
No **Yes**

Does the exposure lamp turn on when the main switch is turned on?
Yes **No**

Replace the ac drive board or the main board.

Check the voltage at CN407-3 on the ac drive board.
24V **0V**

Replace the main board.

Replace the ac drive board.

Check the exposure lamp continuity.
OK NG

Replace the exposure lamp.

Check the thermoswitch when it is cool.
Closed Open

Replace the thermoswitch.

Check the voltage at CN407-3 on the ac drive board.
Stays 24V Drops to 22.5V

Replace the ac drive board.

Replace the main board.

<E13>

- Definition -

1. Lights if the CPU does not receive the zero cross signal within 0.56 second.

- Possible causes -

1. **Main board defective**

2. Zero cross line open

- Action -

Check the voltage at CN111-2 on the main board.
26V 0V

Check the zero cross line from the dc power supply board.

Replace the main board.

2.2 E2 OPTICS

< E20 > (Main Board Check)

- Definition -

1. **Lights if the main CPU does not receive the ready signal from the optics CPU within 10 seconds after the main CPU sends the signal to change the reproduction ratio.**

- Possibie causes -

1. **Optics board defective**

2. Main board defective

- Action -

Replace the optics board or the main board.

< E21 > (Optics Board Check)

- Definition -

1. **Lights if the scanner is more than 0.4 second late in returning to the home position during a multi-copy run, or while in pre-scan for ADS.**

< E22 > (Optics Board Check)

- Definition -

1. **Lights if the home position sensor stays on for longer than the equivalent of 6.3 meters of scanner travel (as measured by the servomotor encoder).**

< E24 > (Main Board Check)

- Definition -

1. Lights if the home position sensor does not turn on before the next scanner start time when in a multi-copy run.

< E2U > (Main Board Check)

- Definition -

1. **Lights if the home position sensor stays on for longer than 1.3 seconds after the scanner starts moving.**

- Possible causes =

1. Home position sensor defective
2. Scanner drive motor pulley or scanner drive wire oily or damaged
3. Scanner drive motor failure
4. Optics board defective
5. Main board defective

- Action -

Does the scanner travel smoothly and correctly?
OK NG

Confirm that the scanner motor is turning.
NG OK

Check the scanner motor pulley and scanner drive wire.

Confirm that the scanner drive voltages appear at CN705-1 and -2 (0 ~ +24V)
NG OK

Replace the scanner drive motor.

Replace the optics board or the main board.

Check the voltage at CN707-6 on the optics board when the scanner is in and out of the home position.
in → 5V NG
out → 0V

Replace the home position sensor.

Replace the optics board or the main board.

< E28 > (Optics Board Check)

- Definition -

1. **Lights if the lens home position sensor does not change from HIGH to LOW within 6.4 seconds when the lens moves from the reduction to the enlargement mode.**

< E29 > (Optics Board Check) .

- Definition -

1. **Lights if the lens home position sensor does not change from LOW to HIGH within 6.4 seconds when the lens moves from the enlargement to the reduction mode.**

- Possible causes -

1. **Lens home position sensor defective**
2. **Lens drive mechanism broken**
3. **Optics board defective**
4. **Main board defective**

- Action -

Check if the lens home position sensor is actuated/deactuated when the lens drive pulley turns.

OK **NG**

↓ ↓

Repair the lens drive mechanism.

Check the voltage change at CN707-7 on the optics board when the lens passes the home position.

5 → 0 V (Enlarge to Reduce) NG
0 → 5 V (Reduce to Enlarge)

↓ ↓

Replace the lens home position sensor.

Replace the optics board or the main board.

< E2A > (Optics Board Check)

- Definition -

1. Lights if the mirror home position sensor does not change from LOW to HIGH within 3.5 seconds when the mirrors move to the home position from the reduction/enlargement mode.

< E2B > (Optics Board Check)

- Definition -

1. Lights if the mirror home position sensor does not change from HIGH to LOW within 3.5 seconds when the mirrors leave the home position.

- Possible causes -

1. Mirror home position sensor defective
2. Mirror drive mechanism broken
3. Optics board defective
4. Main board defective

- Action -

Check if the mirror home position sensor is actuated/deactuated when the mirror drive pulley turns.

OK NG

↓ ↓

Replace the mirror drive mechanism.

↓

Check the voltage change at CN707-8 on the optics board when the mirror arrives at or leaves the mirror home position

5 → 0V (arrive) NG

0 → 5V (leave)

↓ ↓

Replace the mirror home position sensor.

↓

Replace the optics board or the main board.

< E2C > (Optics Board Check)

- Definition -

1. Lights if the scanner travels faster than 670 mm/s.

- Possible causes -

1. Heavy drag on scanner movement

2. AC power fluctuation

3. Defective dc power supply board

4. Optics board defective

5. Main board defective

- Action -

Check if the scanner moves smoothly.
OK NG

Repair the defective part of the scanner drive mechanism.

Check if ac power distribution is constant when the scanner is traveling.
OK NG

Check ac power distribution from the wall outlet.

Check if a constant +24 volts is provided from the dc power supply board.
OK NG

Replace the dc power supply board.

Replace the optics board or the main board.

< E2D > (Optics Board Check)

- Definition -

1. Lights if no encoder pulse is received for 118 milliseconds during the copy cycle.

- Possible causes -

1. Scanner drive motor failure

2. Optics board failure

3. Main board failure

- Action -

Check the voltage at CN704-2 and 3 on the optics board.

Approx. 0.4V → **Replace the optics board or the main board.**

0 or 5V → **Replace the scanner drive motor.**

2.3 E5 FUSING

< E52 >

- Definition -

1. Lights if the temperature detected by the thermistor does not reach 125°C within 75 seconds after the main switch turns on.

- Possible causes -

1. **Thermofuse open**
2. **Fusing relay open**
3. **Fusing lamp open**
4. **Fusing power supply board defective**
5. **Main board defective**

- Action -

Check the thermofuse's continuity.
OK NG

Replace the thermofuse.

Is the fusing relay closed when +24 volts is being supplied between T1 and T6 of the fusing relay?
Yes No

Replace the fusing relay.

Check the fusing lamp's continuity.
OK NG

Replace the fusing lamp.

Check the voltage at CN107-4 on the main board.
0V 24V

Replace the main board.

Replace the fusing power supply board.

< E53 >

- Definition -

1. Lights if the temperature detected by the thermistor stays higher than 270°C.

- Possible causes -

1. Thermistor short
2. Main board defective

- Action -

Check the voltage at CN108-7 on the main board.

Max. 4V

Replace the main board.

4 ~ 5V

Replace the thermistor. (Thermistor short)

< E54 >

- Definition -

1. Lights if the temperature detected by the thermistor stays higher than 210°C for over 145 seconds.

- Possible causes -

1. Fusing triac short
2. Fusing power supply board defective
3. Main board defective

- Action -

Check the continuity between T1 and T2 on the fusing triac.

6 ~ 7 Ω

Replace the triac.

0 Ω

Does the fusing lamp stay on even when the voltage at CN107-4 on the main board is +24 volts?

No

Replace the main board.

Yes

Replace the fusing power supply board.

< E55 >

- Definition -

1. Lights if the temperature detected by the thermistor does not reach 2 “C within 5 seconds after the main switch turns on.

- Possible causes -

1. Thermistor open
2. Fusing triac open
3. Main board defective

- Action -

Check the thermistor’s continuity.
OK NG

Replace the thermistor. (Thermistor open)

Check the voltage at CN107-11 on the main board.
5V 0V

Check the Vc + 5V line.

Check the continuity between T1 and T2 on the fusing triac.
6-7 OHM Open

Replace the triac.

Check the voltage at CN108-7 on the main board.
Max. 4V 0V

Faulty connector or connection replace or correct.

Replace the main board.

2.4 E6 FUNCTIONAL DRIVE
< E61 >

- Definition -

1. Lights if the CPU does not receive a pulse from the pulse generator for 1.6s during a copy cycle.

- Possible causes -

1. Main motor failure
2. AC drive board defective
3. Main board defective
4. Pulse generator sensor defective

- Action -

Does the main motor rotate?
No Yes

Yes:
Check the voltage at CN105-5 on the main board when the Start key is pressed.
No pulse 5V pulse

5V pulse:
Replace the main board.

No pulse:
Replace the pulse generator sensor.

No:
Check main motor continuity.
OK NG (open)

NG (open):
Replace the main motor.

OK:
Check the voltage at CN105-3 when the Start key is pressed.
24V 0V

0V:
Replace the ac drive board.

24V:
Replace the main board.

2.5 E7 MASTER UNIT

< E71 >

- Definition -

1. Lights if the CPU does not detect the sensor plate within 6 s after belt rotation starts.

- Possible causes -

1. No master unit installed
2. Main board defective
3. Master sensor defective.
4. Master unit defective

- Action -

Check the installation of the master unit.
OK NG

Install the master unit.

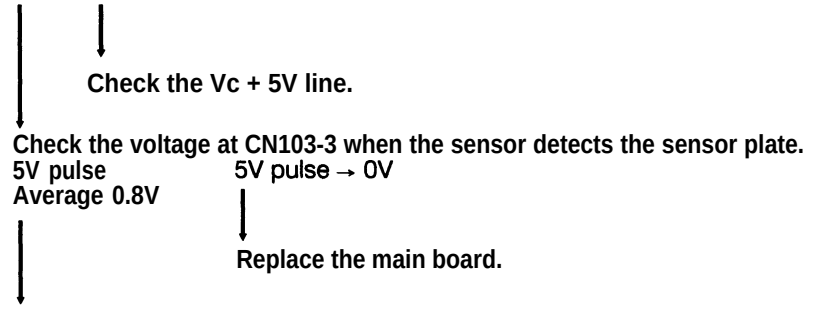
Check the sensor plate on the master belt.
OK NG

Clean the sensor plate surface.

Check master belt rotation.
OK NG

Check the drive section for the master belt.

Check the voltage at CN103-7 on the main board.
5V 0V


Check the Vc + 5V line.
Check the voltage at CN103-3 when the sensor detects the sensor plate.
5V pulse
Average 0.8V
5V pulse → 0V
Replace the main board.
Replace the master sensor.

2.6 E9 OPTICS BOARD

< E93 >

- Definition -

1. Lights if an irregular signal is sent from the optics board to the main board.

- Possible causes -

1. Optics board defective
2. Main board defective

- Action -

Replace the optics board or the main board.

2.7 EA SORTER

< EA1 >

- Definition -

1. Lights if the bin drive motor rotates for longer than 12 seconds.

- Possible' causes -

1. Bins out of position
2. Sorter home position switch open
3. Fuse (FU102) open (sorter main board)

4. Bin drive motor failure
5. Sorter main board defective
6. Copier main board defective

- Action -

Is the bin drive motor powered?
No Yes

Yes:
Check if the bins are the bin guides.
OK NG

NG:
Correct the bin position.

OK:
Check home position switch operation.
OK NG

NG:
Replace the home position switch.

OK:
Replace the sorter main board or the copier main board.

No:
Check the voltage between CN102-8 and -9 on the sorter main board.
0V +12V

+12V:
Replace the bin drive motor,

0V:
Check the fuse (FU102) on the sorter main board.
OK Open

Open:
Replace the fuse.

OK:
Replace the sorter main board or the copier main board.

3. DEFECTIVE SENSOR/SWITCH TABLE

3.1 COPIER

Symbol	Name	Condition	Problem
S1	Home Position Sensor	Open	Self-diagnostic code "E2D"
		Short	Self-diagnostic code "E2D"
S2	Pulse Generator	Open	Self-diagnostic code "E61"
		Short	Self-diagnostic code "E61"
S3	Toner Overflow Sensor	Open	Replace Toner Collection Unit indicator is displayed but no overflow condition exists.
		Short	Replace Toner Collection Unit indicator does not turn on when an overflow condition exists.
S4	Lens Home Position Sensor	Open	Self-diagnostic code "E28"
		Short	Self-diagnostic code "E29"
S5	Mirror Home Position Sensor	Open	Self-diagnostic code "E2B"
		Short	Self-diagnostic code "E2A"
S6	Toner End Sensor	Open	Add Toner indicator does not turn on at toner end.
		Short	Add Toner indicator turns on with sufficient toner present.
S7	Master Sensor	Open	Self-diagnostic code "E71".
		Short	Erratic timing detection of the sensor plate which causes erase and paper misfeed problems.
S8	Auto ID Sensor	Open	Light copy image.
		Short	Light copy image.

Symbol	Name	Condition	Problem
S9	Exit Sensor	Open	Misfeed will occur at paper exit.
		Short	Check Paper Path indicator is displayed at power on. (Initial Jam Check)
S10	Registration Sensor	Open	Misfeed will occur at registration area.
		Short	Check Paper Path indicator is displayed at power on. (Initial Jam Check)
S11	Paper Tray Sensor	Open	Even if the paper tray is raised, copying is permitted.
		Short	Even if the paper tray is lowered, copying is inhibited.
S12	Feed Sensor	Open	Misfeed will occur at paper feed
		Short	Check Paper Path indicator is displayed at power on. (Initial Jam Check)
S13	Paper End Sensor	Open	Even if there is no paper in the cassette, copying is permitted.
		Short	Even if there is paper in the cassette, copying is inhibited.
S14 S15 S16	Paper Width Sensors 1-3	Open	CPU may detect wrong paper size.
		Short	CPU may detect wrong paper size.
S17	Paper Length Sensor	Open	CPU may detect wrong paper size.
		Short	CPU may detect wrong paper size.
SW1	Main Switch	Open	Copier cannot be turned on.
		Short	Copier cannot be turned off.

Symbol	Name	Condition	Problem
SW2	Safety Switch	Open	Copier cannot be powered.
		Short	Safety function does not work.
SW3	Paper Size Switches	Open	CPU may detect wrong paper size.
		Short	CPU may detect wrong paper size.

3.2 DOCUMENT FEEDER

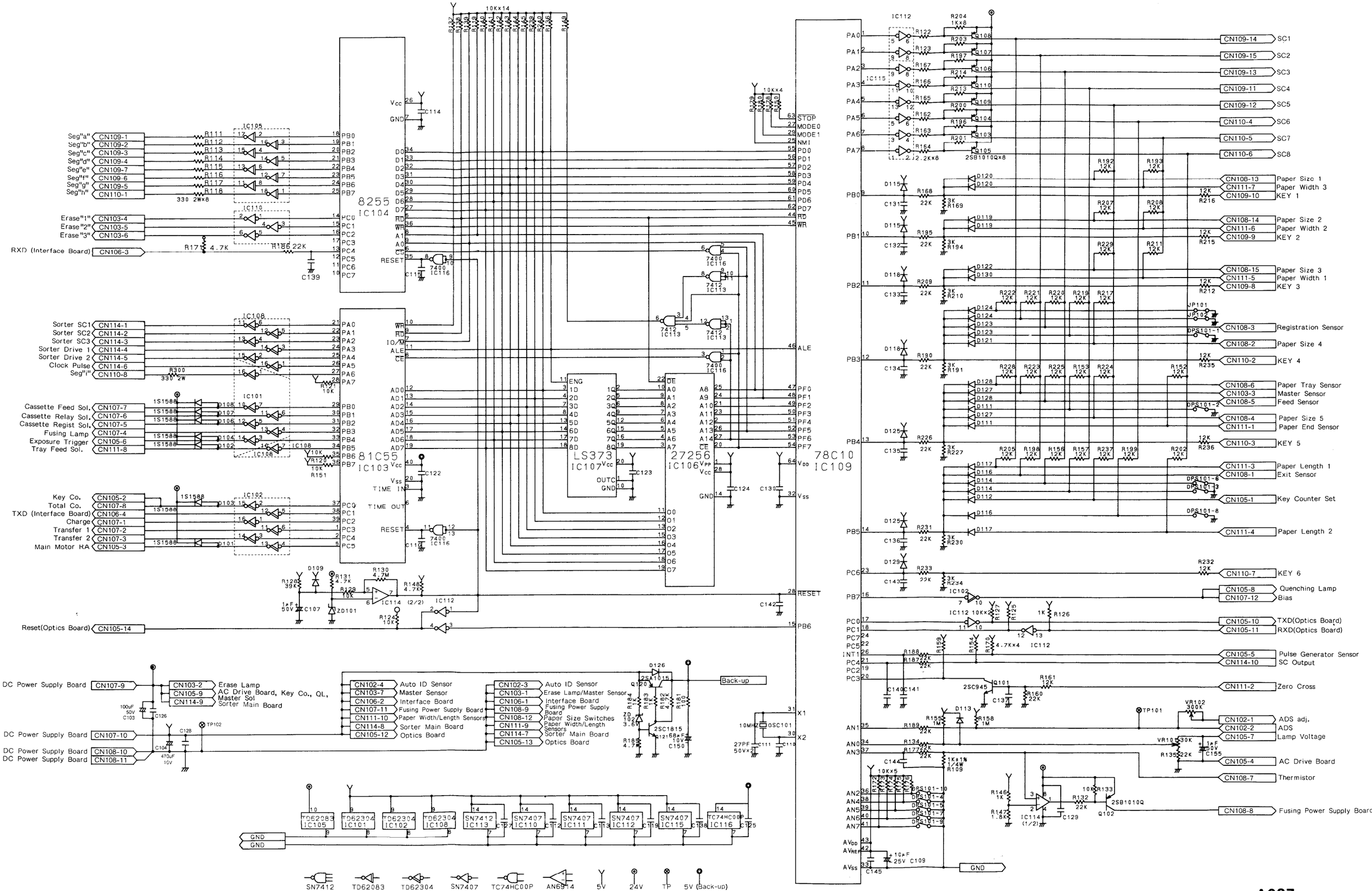
Symbol	Name	Condition	Problem
S1	Original Set Sensor	Open	Insert Original indicator does not turn off even if an original is inserted.
		Short	The Insert original indicator stays off even when no original is inserted.
S2	Registration Sensor	Open	Original Misfeed indicator turns on at power on. (Initial Jam Check)
		Short	Original misfeed will occur during feed-in.
S3	Original Width Sensor	Open	CPU may detect wrong original size.
		Short	CPU may detect wrong original size.
S4	Pulse Generator Sensor	Open	CPU may detect wrong original size.
		Short	CPU may detect wrong original size.
S5	Feed-out Sensor	Open	Original Misfeed indicator turns on at power on. (Initial Jam Check)
		Short	Original misfeed will occur.

3.3 SORTER

Symbol	Name	Condition	Problem
S1	Paper Sensor	Open	Misfeed will occur at sorter entrance.
		Short	Check Sorter Path indicator is displayed at power on. (Initial Jam Check)
SW1	Wheel Switch	Open	Bin drive motor continues to rotate after power on.
		Short	Bin drive motor continues to rotate after power on.
SW2	Sorter Switch	Open	Sorter is inhibited even when engaged with copier.
		Short	Sorter is active even when it is slid away from copier. Sorter misfeed indicator lights as copy cannot enter sorter. "
SW3	Home Position Sensor	Open	Bin drive motor continues to rotate after power on.
		Short	Bin drive motor continues to rotate after power on.

1. COPIER MAIN BOARD SCHEMATIC

August 1, 1988



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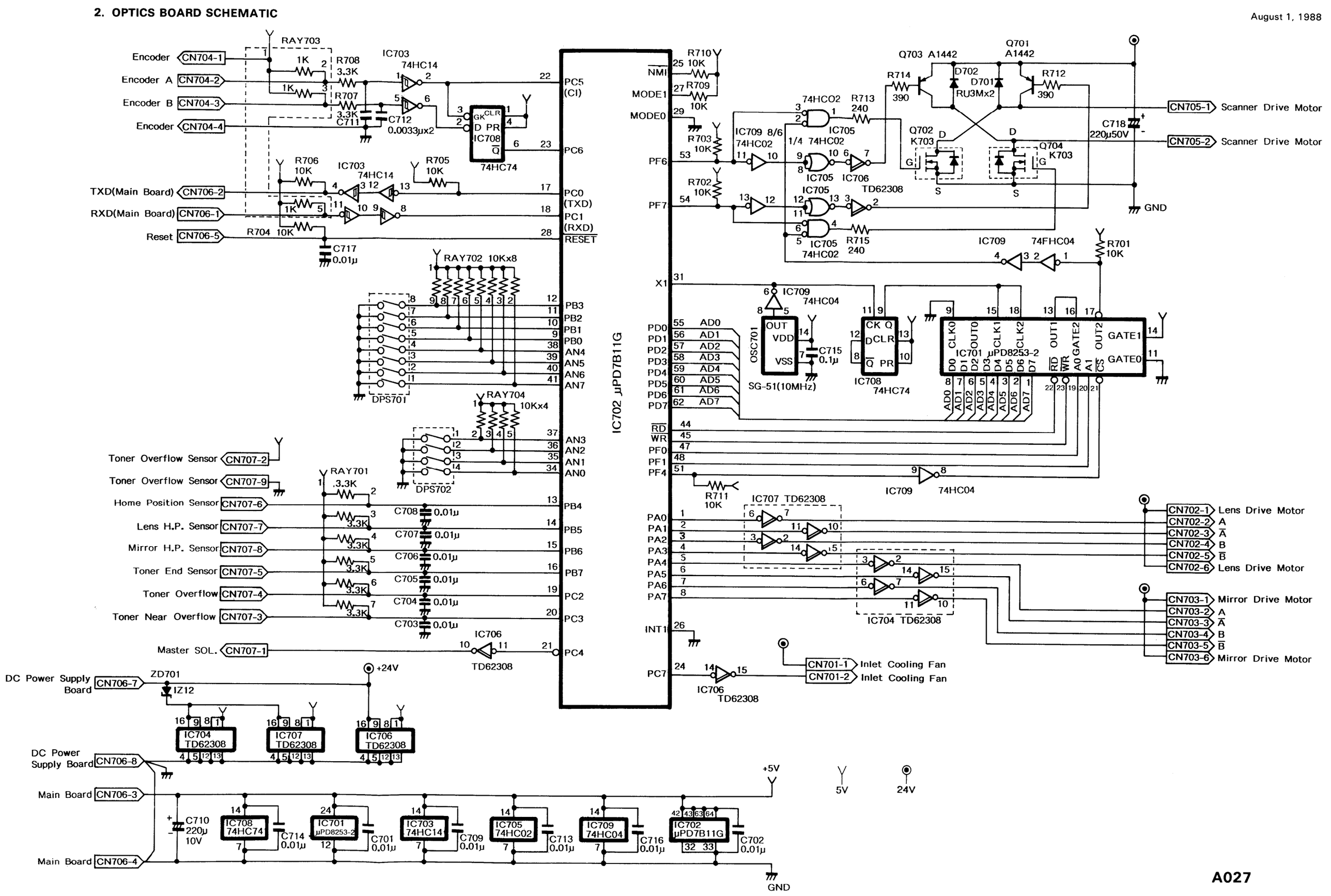

RAY703
Encoder CN704-1
Encoder A CN704-2
Encoder B CN704-3
Encoder CN704-4
1K
R708 3.3K
R707 3.3K
C711
C712 0.0033µx2
IC703 74HC14
IC708 74HC74
PC5 (CI)
PC6
TXD(Main Board) CN706-2
RXD(Main Board) CN706-1
Reset CN706-5
R706 10K
R705 10K
R704 10K
C717 0.01µ
PC0 (TXD)
PC1 (RXD)
RESET
RAY702 10Kx8
DPS701
PB3
PB2
PB1
PB0
AN4
AN5
AN6
AN7
RAY704 10Kx4
DPS702
AN3
AN2
AN1
AN0
Toner Overflow Sensor CN707-2
Toner Overflow Sensor CN707-9
Home Position Sensor CN707-6
Lens H.P. Sensor CN707-7
Mirror H.P. Sensor CN707-8
Toner End Sensor CN707-5
Toner Overflow CN707-4
Toner Near Overflow CN707-3
RAY701 3.3K
C708 0.01µ
C707 0.01µ
C706 0.01µ
C705 0.01µ
C704 0.01µ
C703 0.01µ
PB4
PB5
PB6
PB7
PC2
PC3
Master SOL. CN707-1
IC706 TD62308
DC Power Supply Board CN706-7
ZD701 IZ12
+24V
IC704 TD62308
IC707 TD62308
IC706 TD62308
DC Power Supply Board CN706-8
Main Board CN706-3
Main Board CN706-4
C710 220µ 10V
IC708 74HC74
C714 0.01µ
IC701 µPD8253-2
C701 0.01µ
IC703 74HC14
C709 0.01µ
IC705 74HC02
C713 0.01µ
IC709 74HC04
C716 0.01µ
IC702 µPD7B11G
C702 0.01µ
GND
IC702 µPD7B11G
NMI
MODE1
MODE0
PF6
PF7
X1
PD0 AD0
PD1 AD1
PD2 AD2
PD3 AD3
PD4 AD4
PD5 AD5
PD6 AD6
PD7 AD7
RD
WR
PF0
PF1
PF4
INT1
PC7
R710 10K
R709 10K
R703 10K
R702 10K
IC709 8/6 74HC02
1/4 74HC02
IC705
IC706 TD62308
R713 240
R715 240
IC705 74HC02
OSC701
SG-51(10MHz)
C715 0.1µ
IC708 74HC74
IC709 74HC04
R701 10K
IC701 µPD8253-2
R711 10K
IC707 TD62308
IC704 TD62308
CN701-1 Inlet Cooling Fan
CN701-2 Inlet Cooling Fan
Q703 A1442
Q701 A1442
D702
D701 RU3Mx2
R714 390
R712 390
Q702 K703
Q704 K703
C718 220µ50V
CN705-1 Scanner Drive Motor
CN705-2 Scanner Drive Motor
GND
CN702-1 Lens Drive Motor
CN702-2 A
CN702-3 Ā
CN702-4 B
CN702-5 B̄
CN702-6 Lens Drive Motor
CN703-1 Mirror Drive Motor
CN703-2 A
CN703-3 Ā
CN703-4 B
CN703-5 B̄
CN703-6 Mirror Drive Motor
5V
24V

A027

[11" x 8-1/2"/A4 sideways]

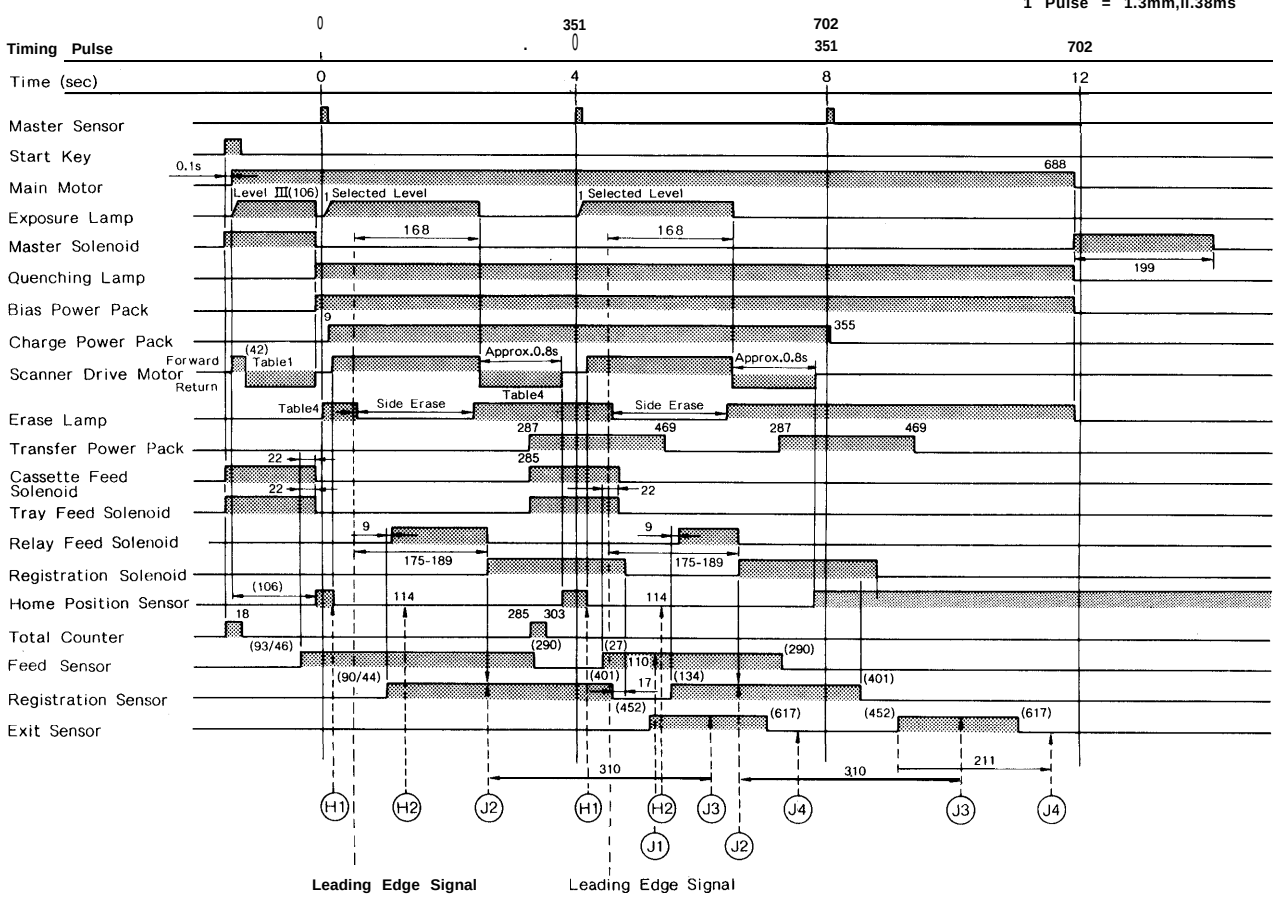
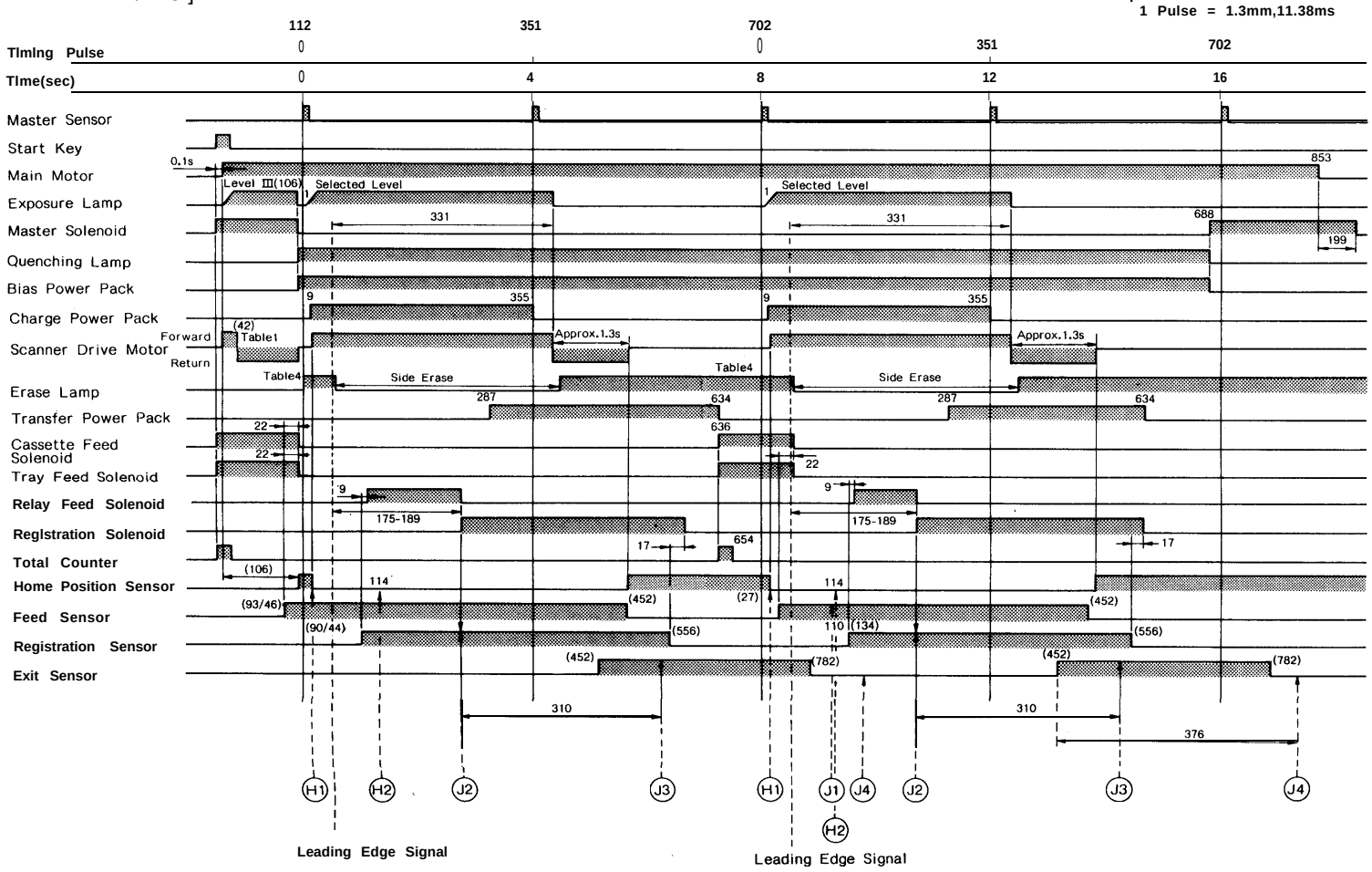


Table 6. Trailing Erase ON

Reproduction Ratio(%)	Pulse Count
50-65	225
66	228
67	232
68	235
69	238
70	241
71	245
72	248
73	251
74	254
75	258
76	261
77	264
78	268
79	271
80	274
81	277
82	281
83	284
84	287
85	291
86	294
87	297
88	300
89	304
90	307
91	310
92	314
93	317
94	320
95	323
96	327
97	330
98	333
99	337
100-200	343

From leading erase OFF

[11''x17''/A3]



Note : Between table 6 and 7, the earliest timing takes priority.

Table 7. Trailing Erase ON

Paper Size	Pulse Count
8"x13	256
8-4/1"x13"	256
8-1/2"x11"	256
8-1/2"x13"	256
8-1/2"x14"	275
10"x14"	275
10"x15"	294
11"x17"	333
B5 Lengthwise	199
A4 Lengthwise	230
B4	281
A3	324
5-1/2"x8-1/2"	168
8-1/2"x5-1/2"	110
11"x8-1/2"	168
A6 Lengthwise	116
B6 Lengthwise	142
A5 Lengthwise	163
A5 Sideways	116
B5 Sideways	142
A4 Sideways	163

From leading edge erase OFF

JAM CHECK

- **J 1 : Feed Sensor ON Check**
- **J2 : Registration Sensor ON Check**
- **J3 : Exit Sensor ON Check**
- **J4 : Exit Sensor OFF Check**

HOME POSITION CHECK

- **H 1 : Home Position Sensor ON Check**
- **H2 : Home Position Sensor OFF Check**

Table 1. Scanner Start Timing

Reproduction Ratio(%)	Pulse Count
50-51	46
52-54	47
55-59	46
60-74	47
75-80	46
81-86	45
87-91	44
92-94	43
95-100	42
101-106	41
107-111	40
112-115	39
116-117	38
118-123	37
124-128	36
129-133	35
134-138	34
139-143	33
144-147	32
148-152	31
153-156	30
157-161	29
162-164	28
165-169	27
170-174	26
175-176	25
177-178	24
179-181	23
182-184	22
185	21
186-190	20
191-194	19
195-198	18
199-200	17

From master sensor ON

Table 2. Registration Timing

Reproduction Ratio(%)	Pulse Count
50	187
51-55	186
56-61	185
62-67	184
68-76	183
77-122	182
123-139	183
140-149	184
150-164	185
165-174	186
175-182	187
183-191	188
192-200	189

From leading edge signal

Table 3. Registration Timing Adjustment (DPS101)

3	2	1	Pulse Count Change
OFF	OFF	OFF	0
OFF	OFF	ON	-1
OFF	ON	OFF	-2
OFF	ON	ON	-3
ON	OFF	OFF	-4
ON	OFF	ON	-5
ON	ON	OFF	-6
ON	ON	ON	-7

Regist, Timing = Pulse Count (Table 2)-Pulse Count Change (Table 3)

Table 4. Leading Erase OFF

Reproduction Ratio(%)	Pulse Count
50-52	17
53-56	16
57-60	15
61-66	14
67-74	13
75-94	12
95-105	11
106-134	12
135-150	13
151-164	14
165-177	15
178-189	16
190-200	17

From leading edge signal

Leading Erase Timing = Pulse Count (Table 4) + Time (Table 5)

Table 5. Leading Erase Adjustment (DPS701)

4	3	2	Time (ms)
ON	ON	ON	51
OFF	ON	ON	44
ON	OFF	ON	37
OFF	OFF	ON	30
ON	ON	OFF	23
OFF	ON	OFF	17
ON	OFF	OFF	10
OFF	OFF	OFF	3

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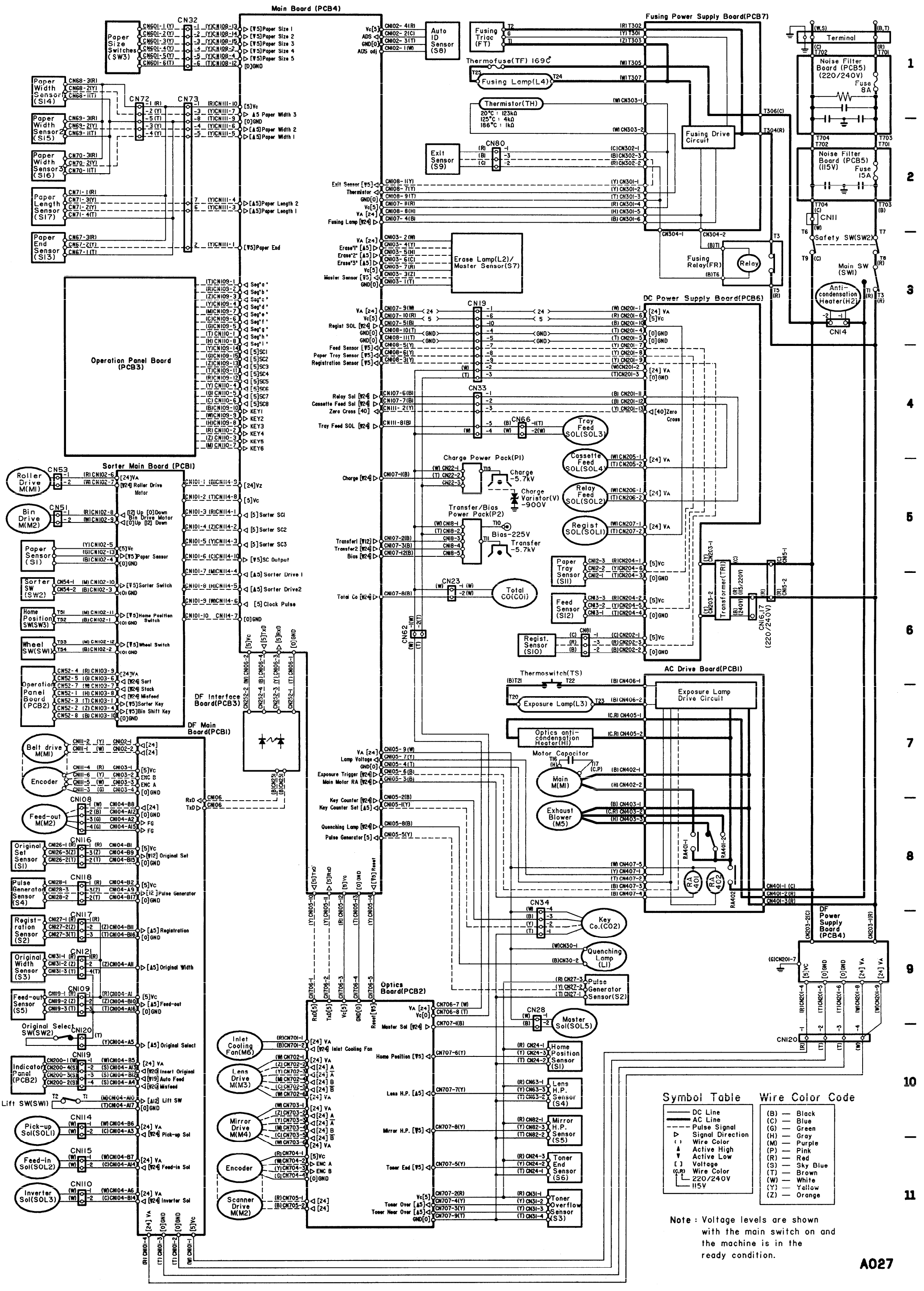
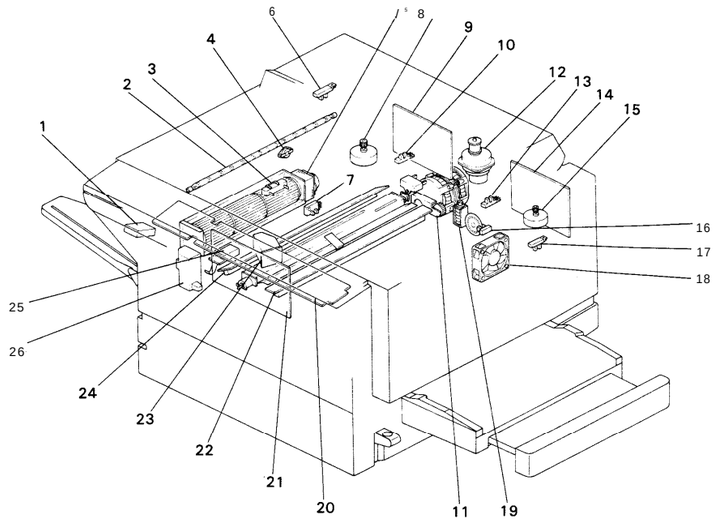
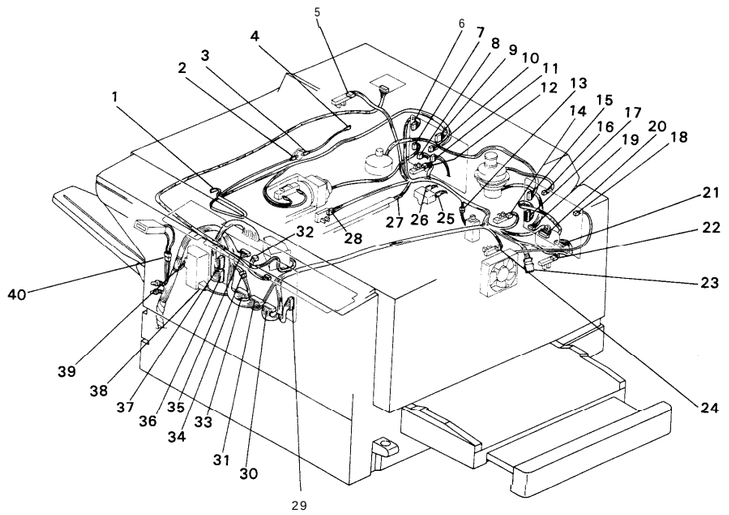
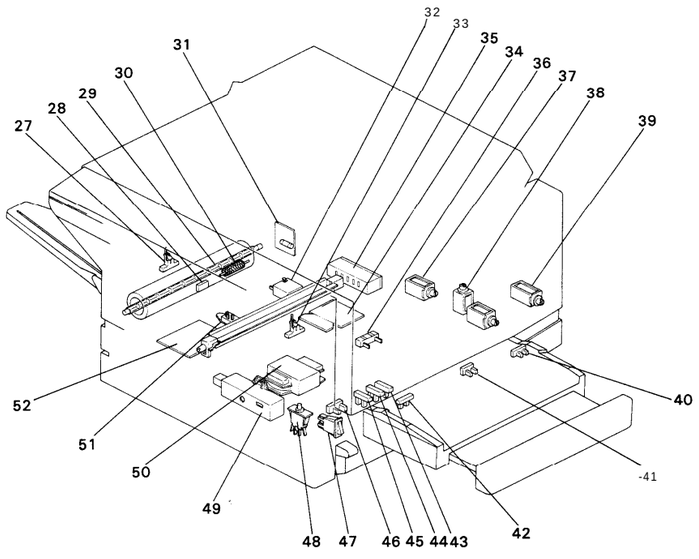
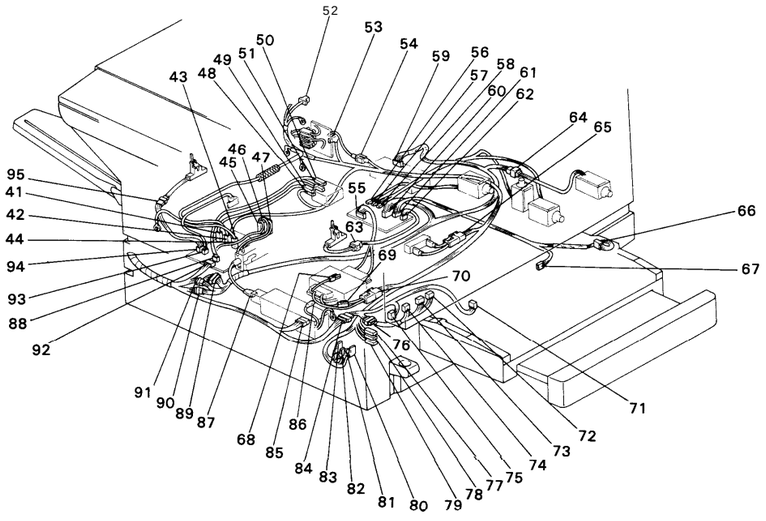

Main Board (PCB4)
Fusing Power Supply Board(PCB7)
DC Power Supply Board(PCB6)
AC Drive Board(PCB1)
Sorter Main Board (PCB1)
Operation Panel Board (PCB3)
DF Interface Board(PCB3)
DF Main Board(PCB1)
Optics Board(PCB2)
DF Power Supply Board (PCB4)
Paper Size Switches (SW3)
Paper Width Sensor (SI4)
Paper Width Sensor2 (SI5)
Paper Width Sensor3 (SI6)
Paper Length Sensor (SI7)
Paper End Sensor (SI3)
Auto ID Sensor (S8)
Fusing Triac (FT)
Thermofuse(TF) 169℃
Fusing Lamp(L4)
Thermistor(TH)
20℃ : 123kΩ
125℃ : 4kΩ
186℃ : 1kΩ
Exit Sensor (S9)
Fusing Drive Circuit
Terminal
Noise Filter Board (PCB5) (220/240V)
Fuse 8A
Noise Filter Board (PCB5) (115V)
Fuse 15A
Safety SW(SW2)
Main SW (SW1)
Anti-condensation Heater(H2)
Erase Lamp(L2)/ Master Sensor(S7)
Fusing Relay(FR)
Relay
Regist SOL(SOL1)
Relay Feed SOL(SOL2)
Cassette Feed SOL(SOL4)
Tray Feed SOL(SOL3)
Charge Power Pack(PI)
Charge -5.7kV
Charge Varistor(V) -900V
Transfer/Bias Power Pack(P2)
Bias -225V
Transfer -5.7kV
Total CO(CO1)
Paper Tray Sensor (SI1)
Feed Sensor (SI2)
Regist. Sensor (SI0)
Transformer(TR1)
Thermoswitch(TS)
Exposure Lamp(L3)
Exposure Lamp Drive Circuit
Optics anti-condensation Heater(H1)
Motor Capacitor
Main M(M1)
Exhaust Blower (M5)
Key Co.(CO2)
Quenching Lamp (LI)
Pulse Generator Sensor(S2)
Master Sol(SOL5)
Home Position Sensor (SI)
Lens H.P. Sensor (S4)
Mirror H.P. Sensor (S5)
Toner End Sensor (S6)
Toner Overflow Sensor (S3)
Roller Drive M(MI)
Bin Drive M(M2)
Paper Sensor (SI)
Sorter SW (SW2)
Home Position SW(SW3)
Wheel SW(SW1)
Operation Panel Board (PCB2)
Belt drive M(MI)
Encoder
Feed-out M(M2)
Original Set Sensor (SI)
Regist-ration Sensor (S2)
Original Width Sensor (S3)
Feed-out Sensor (S5)
Original Select SW(SW2)
Indicator Panel (PCB2)
Lift SW(SW1)
Pick-up Sol(SOL1)
Feed-in Sol(SOL2)
Inverter Sol(SOL3)
Pulse Generator Sensor (S4)
Inlet Cooling Fan(M6)
Lens Drive M(M3)
Mirror Drive M(M4)
Encoder
Scanner Drive M(M2)
Symbol Table
DC Line
AC Line
Pulse Signal
Signal Direction
Wire Color
Active High
Active Low
Voltage
Wire Color
220/240V
115V
Wire Color Code
(B) — Black
(C) — Blue
(G) — Green
(H) — Gray
(M) — Purple
(P) — Pink
(R) — Red
(S) — Sky Blue
(T) — Brown
(W) — White
(Y) — Yellow
(Z) — Orange
Note : Voltage levels are shown with the main switch on and the machine is in the ready condition.
A027

ELECTRICAL COMPONENTS AND CONNECTOR LAYOUT-COPIER









Index No.	Description	Symbol	P to P
1.	Total Counter	Co1	E6
2.	Exposure Lamp	L3	E7
3.	Optics Anti-condensation Heater	H1	E7
4.	Thermoswitch	TS	E6
5.	Exhaust Blower	M5	E8
6.	Home Position Sensor	S1	E10
7.	Toner Overflow Sensor	S3	E11
8.	Lens Drive Meter	M3	B10
9.	AC Drive Board	PCB1	F6-G9
10.	Lens Home Position Sensor	S4	E10
11.	Main Motor	M I	E7
12.	Scanner Drive Motor	M2	B1 1
13.	Mirror Home Position Sensor	S5	E10
14	Optics Board	PCB2	C9-D11
15.	Mirror Drive Motor	M4	B10
16.	Pulse Generator Sensor	S2	F9
17.	Toner End Sensor	S6	E1 1
18.	Inlet Cooling Fan	M6	B10
19.	Master Solenoid	SOL5	F9
20.	Operation Panel Board	PCB3	A3-B4
21.	Main Board	PCB4	B1-D8
22.	Erase Lamp/Master Sensor	L2/S7	E3
23.	Auto ID Sensor	S8	D1
24.	Quenching Lamp	L1	F9
25.	Charge Varistor	v	E5
26.	Charge Power Pack	P1	E5

Index No.	Description	Symbol	P to P
27.	Exit Sensor	S9	D2
28.	Thermistor	TH	EI
29.	Fusing Lamp	L4	EI
30.	Thermofuse	TF	EI
31.	Noise Filter Board	PCB5	H1-H2
32.	Fusing Relay	FR	G3
33.	Registration Sensor	S10	E6
34.	DC Power Supply Board	PCB6	F3-G6
35.	Paper Size Switches	SW3	A1
36.	Anti-condensation Heater	H2	H3
37.	Registration Solenoid	SOL1	F5
38.	Relay Feed Solenoid	SOL2	F5
39.	Tray Feed Solenoid	SOL3	F4
40.	Paper Tray Sensor	S11	F5
41.	Feed Sensor	S12	F6
42.	Paper End Sensor	S13	A3
43.	Paper Width Sensor 1	S14	AI
44,	Paper Width Sensor 2	S15	A2
45.	Paper Width Sensor 3	S16	A2
46.	Paper Length Sensor	S17	A2
47,	Main Switch	SW1	H3
48.	Safety Switch	SW2	H3
49,	Transfer/Bias Power Pack	P2	E5
50.	Transformer	TR 1	G6
51.	Fusing Triac	FT	EI
52	Fusing Power Supply Board	PCB7	F1-G2

ndex No.	CN No.	Component	Symbol	Type	P to P
1.	T23	Exposure Lamp	L3	1P/—	F7
2.	T21	Thermoswitch	TS	1P/—	E6
3.	T22	Thermoswitch	TS	1P/—	E6
4.	T20	Exposure Lamp	L3	1P/—	E7
5.	CN24	Home Position Sensor	S1	3P/T	E10
6.	CN407	AC Drive Board	PCB1	5P/T	F8
7.	CN403	AC Drive Board	PCB1	4P/R	F8
8.	CN402	AC Drive Board	PCB1	2P/W	F7
9.	CN401	AC Drive Board	PCB1	3P/W	F8
10.	CN405	AC Drive Board	PCB1	2P/B	F7
11.	CN406	AC Drive Board	PCB1	2P/Y	F7
12.	CN63	Lens H.P. Sensor	S4	3P/T	E10
13.	CN28	Master Solenoid	SOL5	2P/R	E9
14.	CN82	Mirror H.P. Sensor	S5	3P/T	E10
15.	CN702	Optics Board	PCB2	6P/T	C10
16.	CN705	Optics Board	PCB2	2P/T	C11
17.	CN703	Optics Board	PCB2	7P/R	C10-C11
18.	CN701	Optics Board	PCB2	2P/T	C10
19.	CN704	Optics Board	PCB2	4P/T	C11
20.	CN706	Optics Board	PCB2	8P/T	C9-D9
21.	CN707	Optics Board	PCB2	9P/T	D10-D11
22.	CN24	Toner End Sensor	S6	3P/T	E11
23.	CN34	Key Counter	CO2	4P/W	E9
24.	CN27	Pulse Generator Sensor	S2	3P/T	F9
25.	T16	Motor Capacitor	—	1P/—	E7
26.	T17	Motor Capacitor	—	1P/—	F7
27.	CN30	Quenching Lamp	L1	2P/T	F9
28.	CN31	Toner Overflow Sensor	S3	4P/T	E11
29.	CN103	Main Board	PCB4	7P/T	D3
30.	CN105	Main Board	PCB4	15P/R	C8, D7-D8
31.	CN107	Main Board	PCB4	12P/T	D2-D6
32.	CN102	Main Board	PCB4	4P/T	D1
33.	CN108	Main Board	PCB4	15P/T	B1, D2-D4
34.	CN62	—	—	2P/B	D6
35.	CN111	Main Board	PCB4	10P/T	B2-B4, D4
36.	CN110	Main Board	PCB4	8P/R	B3-B4
37.	CN109	Main Board	PCB4	15P/R	B3-B4
38.	T15	Charge Power Pack	P1	1P/—	E5
39.	CN22	Charge Power Pack	P1	3P/T	D5
40.	CN23	Total Counter	CO1	2P/B	D6
41.	T304	Fusing Power Supply Board	PCB7	1P/W	G2
42.	T305	Fusing Power Supply Board	PCB7	1P/W	F1
43.	T306	Fusing Power Supply Board	PCB7	1P/W	G1
44.	T307	Fusing Power Supply Board	PCB7	1P/W	F1
45.	T2	Fusing Triac	FT	1P/W	E1
46.	G	Fusing Triac	FT	1P/W	E1
47.	T1	Fusing Triac	FT	1P/W	E1
48.	T5	Fusing Relay	FR	1P/W	G3
49.	T3	Fusing Relay	FR	1P/W	G3
50.	T1	Fusing Relay	FR	1P/W	G3
51.	T6	Fusing Relay	FR	1P/W	G3
52.	CN203	(DF Power Supply Board)	PCB4	2P/B	H9
53.	T703	Noise Filter Board	PCB5	1P/—	H2
54.	CN111	Noise Filter Board	PCB5	1P/W	H2
55.	CN203	DC Power Supply Board	PCB6	2P/B	G6
56.	CN207	DC Power Supply Board	PCB6	2P/B	F5
57.	CN206	DC Power Supply Board	PCB6	2P/T	F5
58.	CN205	DC Power Supply Board	PCB6	2P/R	F5
59.	CN601	Paper Size Switch	SW3	6P/T	A1
60.	CN201	DC Power Supply Board	PCB6	13P/T	F3-F4
61.	CN204	DC Power Supply Board	PCB6	6P/T	F5-F6
62.	CN202	DC Power Supply Board	PCB6	3P/R	F6
63.	CN81	Registration Sensor	S10	3P/R	F6
64.	CN66	Tray Feed Solenoid	SOL3	2P/R	E4
65.	CN14	Anti-condensation Heater	H2	2P/R·W	H3
66.	CN12	Paper Tray Sensor	S11	3P/T	F5-F6
67.	CN13	Feed Sensor	S12	3P/R	F6
68.	CN17	Transformer	TR1	1P/W	G6
69.	CN16	Transformer	TR1	1P/W	G6
70.	CN15	Transformer	TR1	2P/W	G5-G6
71.	CN67	Paper End Sensor	S13	3P/T	A3
72.	CN68	Paper Width Sensor 1	S14	3P/R	A1
73.	CN69	Paper Width Sensor 2	S15	3P/T	A2
74.	CN70	Paper Width Sensor 3	S16	3P/B	A2
75.	CN71	Paper Length Sensor	S17	4P/T	A2
76.	CN72	—	—	6P/T	A1-A2
77.	T3	Main Switch	SW1	1P/Y	H3
78.	T2	Main Switch	SW1	1P/W	H3
79.	T1	Main Switch	SW1	1P/—	H3
80.	T6	Safety Switch	SW2	1P/—	H3
81.	T7	Safety Switch	SW2	1P/—	H3
82.	T8	Safety Switch	SW2	1P/—	H3
83.	T9	Safety Switch	SW2	1P/—	H3
84.	CN73	—	—	8P/T	B1-B3
85.	CN18	Transfer/Bias Power Pack	P2	5P/T	D5
86.	T10	Transfer/Bias Power Pack	P2	1P/—	E5
87.	T11	Transfer/Bias Power Pack	P2	1P/—	E5
88.	CN304	Fusing Power Supply Board	PCB7	2P/B	F2-G2
89.	CN19	—	—	10P/T	E3-E4
90.	CN33	—	—	6P/B	E4
91.	CN32	—	—	6P/R	B1
92.	CN301	Fusing Power Supply Board	PCB7	6P/T	F2
93.	CN303	Fusing Power Supply Board	PCB7	2P/T	F2-F2
94.	CN302	Fusing Power Supply Board	PCB7	3P/T	F2
95.	CN80	Exit Sensor	S9	3P/T	E2

SECTION 8

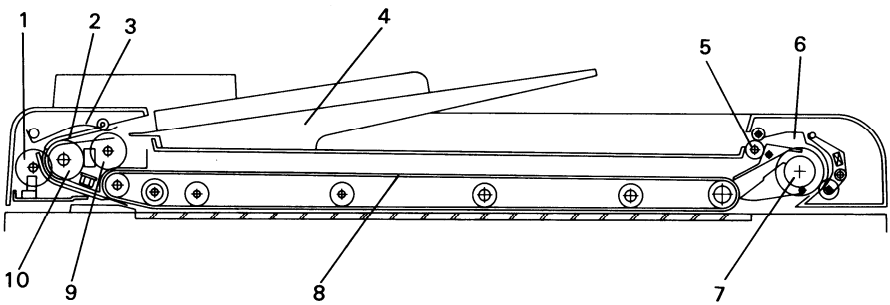
DOCUMENT FEEDER

1. SPECIFICATIONS

Original Size and Weight:	**- Thin original mode -** **Maximum** **A3/11"x17"** **Minimum** **B6/ 5½" x 8½"** **Weight** **41 to 128g/m²(11 to 34 lb)** **- Thick original mode -** **Maximum** **A3/11"x17"** **Minimum** **B6/ 5½" x 8½"** **Weight** **52 to 128 g/m²(14 to 34 lb)** **- Auto reverse mode -** **Maximum** **A3/11"x17"** **Minimum** **66 lengthwise/ 5½" x 8½" lengthwise** **Weight** **64 to 105 g/m (17 to 28 lb)**
Original Feed:	**Automatic feed – ADF mode** **Manual feed one by one – SADF mode**
Original Table Capacity:	**30 sheets/80 g/m² (20 lb)**
Original Set:	**Face up. First sheet on top**
Original Transport:	**One flat belt**
Copy Speed:	**15 copies/minute for A4 / 8½" x 11" sideways**
Power Consumption:	**20W**
Dimensions (W x D x H):	**670 x 460x 103 mm (26.4"x 18.1" x 4.1")**
Weight:	**Approximately 8.8 kg (19.4 lb)**
Copier Interface Equipment:	**Power Supply Unit for DF54**

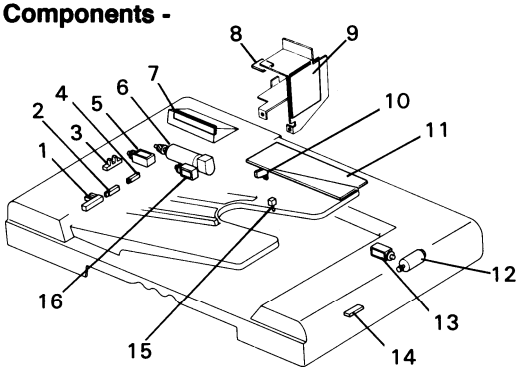
2. COMPONENT LAYOUT

- Mechanical Components -



1. Pulse Generator Disk
2. Friction Belt
3. Pick-up Lever
4. Original Table
5. Exit Roller
6. Inverter Pawl
7. Inverter Roller
8. Transport Belt
9. Pick-up Roller
10. Feed Roller

- Electrical Components -



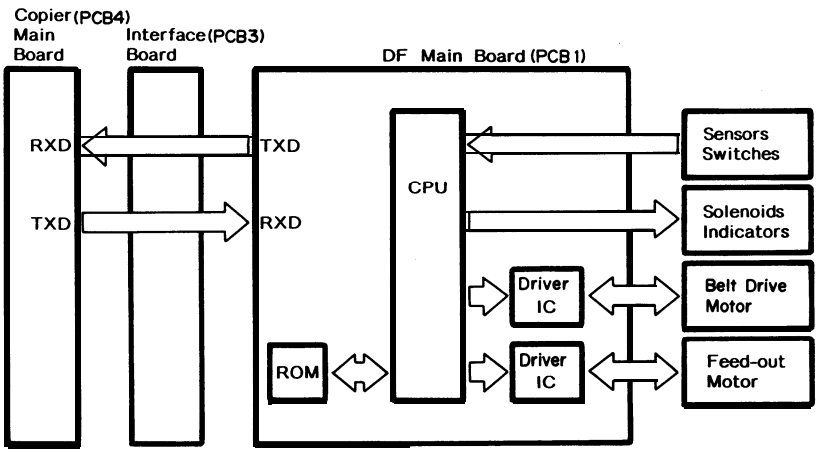
1. Original Set Sensor
2. Registration Sensor
3. Pulse Generator Sensor
4. Original Width Sensor
5. Pick-up Solenoid
6. Belt Drive Motor
7. Indicator Panel
8. Interface Board
9. DF Power Supply Board
10. Lift Switch
11. DF Main Board
12. Feed-out Motor
13. Inverter Solenoid
14. Feed-out Sensor
15. Original Select Switch
16. Feed-in Solenoid

3. ELECTRICAL COMPONENT DESCRIPTIONS

Symbol	Name	Function	Location
Motors			
M1	Belt Drive Motor	DC servomotor that drives to the transport belt and feed-in system (pick-up roller, feed roller, pull-out roller and relay roller).	6
M2	Feed-out Motor	DC servomotor that drives the feed-out unit of the DF.	12
Solenoids			
SOL1	Pick-up Solenoid	Energizes to press the pick-up lever against the stack of originals in preparation for original feed-in.	5
SOL2	Feed-in Solenoid	Turns onto engage the feed-in clutch so rotation is transmitted to the feed roller, pull-out rollers, and relay rollers.	16
SOL3	Inverter Solenoid	Energizes to invert the original when copying two sided originals.	13
Switches			
SW1	Lift Switch	informs the CPU when the DF is lifted and also serves as the jam reset switch for the DF.	10
SW2	Originai Select Switch	Selects thick original mode or thin original mode.	15
Sensors			
S1	Original Set Sensor	informs copier CPU that originals have been placed and causes the insert Original indicator to go out.	1
S2	Registration Sensor	Sets original stop timing and measures original length.	2
S3	Original Width Sensor	Determines the width of the originals.	4
S4	Pulse Generator Sensor	Generates pulses used to measure the original length.	3
S5	Feed-out Sensor	Checks for original misfeeds and sets original stop timing when in auto reverse mode.	14

Symbol	Name	Function	Location
Printed Circuit Boards			
PCB1	DF Main Board	Controls all DF functions.	11
PCB2	Indicator Panel Board	Contains operator indicators.	7
PCB3	InterFace Board	All signals between DF and copier pass through this board.	8
PCB4	DF Power Supply Board	Rectifies line voltage to +24 volts and +5 volts.	9

4. OVERALL MACHINE CONTROL



The DF CPU monitors the input signals from the sensors and switches, and energizes the solenoids and the indicator LEDs directly. The belt drive motor and the inverter motor are controlled by the DF CPU through their respective driver ICs.

Also, the DF CPU communicates with the copier using a serial interface. The exchanged signals are shown in the tables on the next page.

1. DF → Copier

No.	Signal Name	Definition
1	Original Set	Originals are set on the original table.
2	Copy Start	Allows the copier to start copy sequence.
3	Lift Up	The DF is lifted.
4	DF Misfeed	Misfeed occurs in the DF.

2. Copier → DF

No.	Signal Name	Definition
1	Feed-in	Requests the DF to feed-in the original.
2	Feed-out	Requests the DF to feed-out the original.
3	Invert Original	Requests the DF to invert the original.
4	Auto Feed	Shifts the DF to the auto feed mode.
5	Original Stay	Attempt to use DF but the original from the previous copy run remains on the exposure glass.

5. BASIC OPERATION

1. One-sided Original Feed

When an original is inserted face up into the DF, the Insert Original indicator light goes out and the DF informs the copier CPU that originals have been set.

When the Start key is pressed, the copier CPU moves the scanner 100 mm away from the left scale and sends the feed-in signal to the DF. On receipt of this signal, the DF energizes the pick-up solenoid, the feed-in solenoid, and the belt drive motor in order to feed-in the bottom sheet of the original stack onto the exposure glass. The pick-up solenoid and the feed-in solenoid remain energized until the original leading edge reaches the DF registration sensor. The belt drive motor turns off shortly after the original's trailing edge passes the DF registration sensor.

While feeding the original, the DF registration sensor and the paper width sensor check the original size.

Just when the original trailing edge has passed the DF registration sensor, the DF CPU sends the copy start signal to the copier. On receipt of the signal, the copier CPU carries out the original ID measurement while returning the scanner to the home position and starts the copy cycle.

When the scanner reaches to the return position, the copier CPU sends the feed-out and the feed-in signals to the DF CPU in order to exchange the original with the next original. At this time, the scanner begins returning to the home position, but stays 100 mm away from the left scale until the next original is on the exposure glass. At this time the original ID measurement is taken.

When the scanner comes to the return position after scanning the last original, the copier CPU only sends the feed-out signal in order to feed-out the last original.

2. Two-sided Original Feed

Unlike one-sided original feed, the back side of the original must be copied first to keep the originals and copies in the correct order.

During original feed-in, the sequence is the same as for one-sided feed; however, the DF CPU also energizes the inverter motor and the inverter solenoid a short time after the original trailing edge has passed the DF registration sensor. The belt drive motor continues to feed the original until the original leading edge passes the feed-out sensor. At this point the inverter mechanism inverts the original, in preparation for copying the back

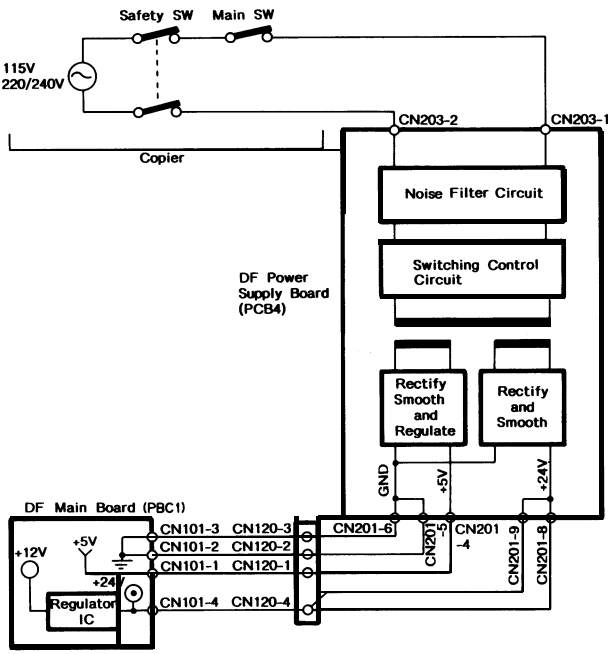
side. Then the belt drive motor reverses and the original is fed towards the left scale and is aligned against the scale. The DF CPU sends the copy start signal a short time after the original trailing edge has passed the feed-out sensor.

When the scanner reaches to the return position, the copier CPU sends the invert original signal to the DF CPU in order to make a copy of the front side. The original is inverted in the same way as for back side copying.

3. Semi-automatic Document Feed

If a single original is inserted into the original table and copied, the DF shifts to the semi-automatic feed mode and lights the Auto Feed indicator. The Auto Feed indicator remains on for five seconds after the copier main motor stops. If another original is inserted within that five-second period, it is automatically fed and copied.

6. POWER DISTRIBUTION

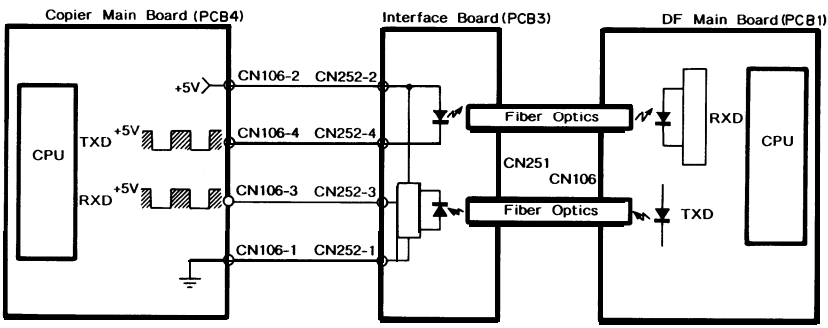


The DF uses three dc power levels: +24 volts, +12 volts, and +5 volts.

The line voltage is applied to the DF power supply board where it is stepped down and rectified to +24 volts and +5 volts. Then, those two dc voltages are supplied to the DF main board.

The regulator IC on the DF main board further steps down the +24 volts to +12 volts.

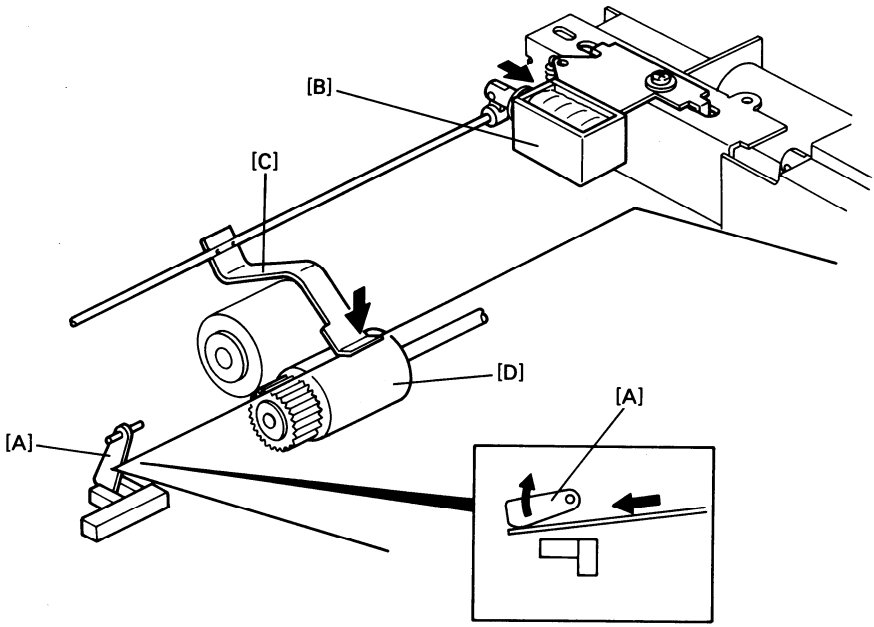
7. INTERFACE CIRCUIT



The Copier CPU and the DF CPU communicate via the interface board and fiber optics. The interface board changes the optical signals to electrical signals (only vice versa).

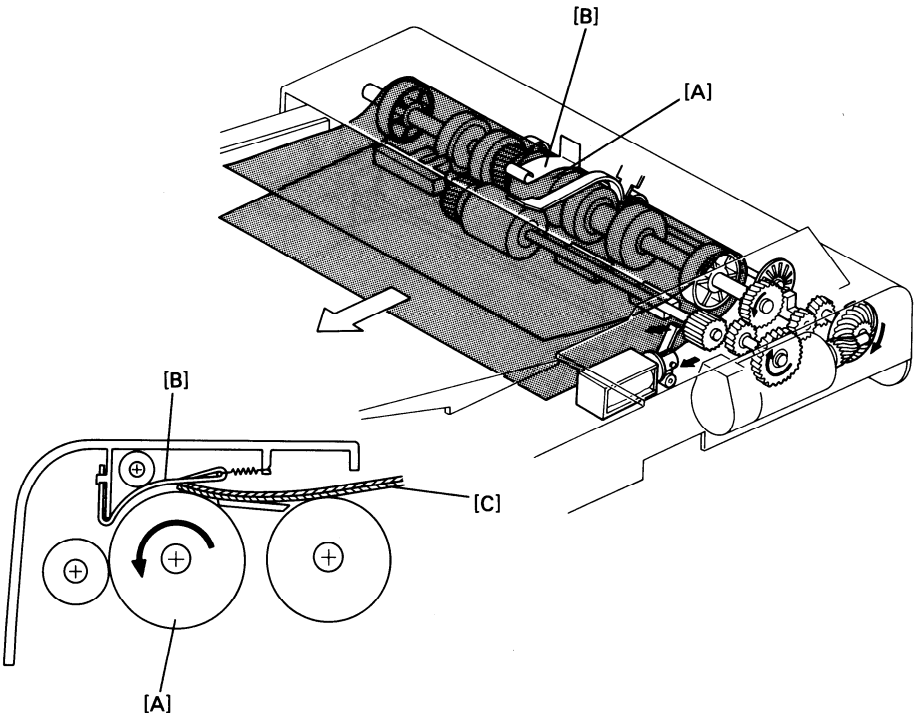
8. ORIGINAL FEED

8.1 ORIGINAL PICK-UP



After setting the originals on the original table, the originals contact the feeler [A] of the original set sensor and cause the feeler to move out of the sensor. The DF then sends the original set signal to the copier CPU to inform it that the DF will be used. When the Start key is pressed, the pick-up solenoid [B] is energized. The original stack is then pressed between the pick-up lever [C] and pick-up roller [D]. The rotation of the pick-up roller advances the bottom original.

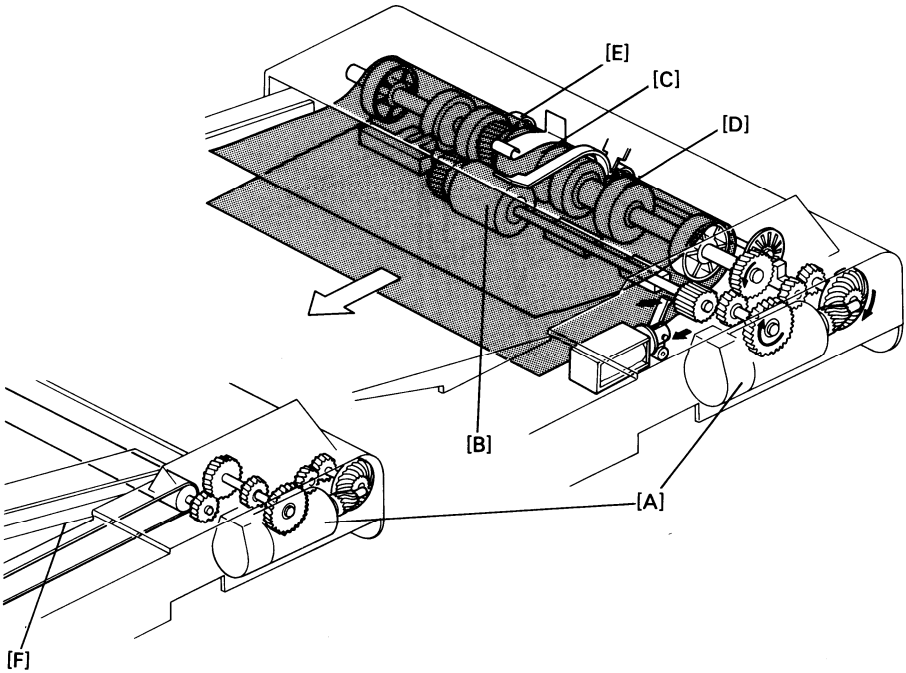
8.2 ORIGINAL SEPARATION



The feed roller [A] and the friction belt [B] are used to feed-in and separate the originals [C]. Only the bottom original is fed because the friction belt prevents any other originals from feeding.

Original feed starts when the feed roller starts turning and advances the bottom original of the stack. The feed roller moves the original past the friction belt because the driving force of the feed roller is greater than the resistance of the friction belt. The friction belt prevents multiple feeds because the resistance of the friction belt is greater than the friction between original sheets.

8.3 ORIGINAL FEED-IN MECHANISM

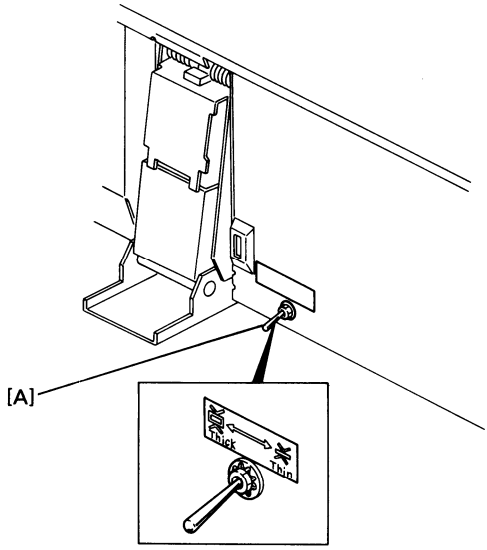


The belt drive motor [A] drives the pick-up roller [B], the feed roller [C], the pull out roller [D], the relay roller [E], and transport belt [F] via a feed clutch and a gear train.

The pick-up and feed-in solenoids are energized 100 milliseconds after the Start key of the copier is pressed. Then 100 milliseconds after the solenoids are energized, the belt drive motor starts turning. The pulse generator disc [G] always turns when the belt drive motor is on.

Slightly after the original trailing edge passes the registration sensor, the relay rollers and the transport belt stop turning.

This document feeder has two different ways of stopping original at the correct position on the exposure glass. They are called the “thin original mode” and the “thick original mode”. The mode used is determined by the original select switch [A].



- Original Select Switch -

1. Thin Original Mode

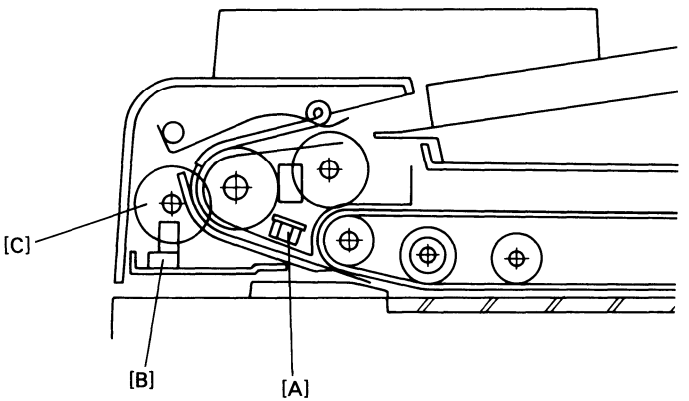
The original is stopped at the correct position on the exposure glass based on encoder pulse count. The belt drive motor stops shortly after the original trailing edge passes the DF registration sensor. (Exact timing depends on registration adjustment.) Thin original mode is selected at the factory.

2. Thick Original Mode

When thick original mode is selected, the belt drive motor remains energized for an additional 30 encoder pulses as compared to thin original mode. Then, the belt drive motor pauses and reverses for 21 pulses. This forces the original against the left scale and thus aligns the edge of the original with the scale.

After the exposure cycle is completed, the copier sends the feed-out signal to the DF CPU and the belt drive and feed out motors start turning. At this time, the copied original feeds out and the next original feeds in.

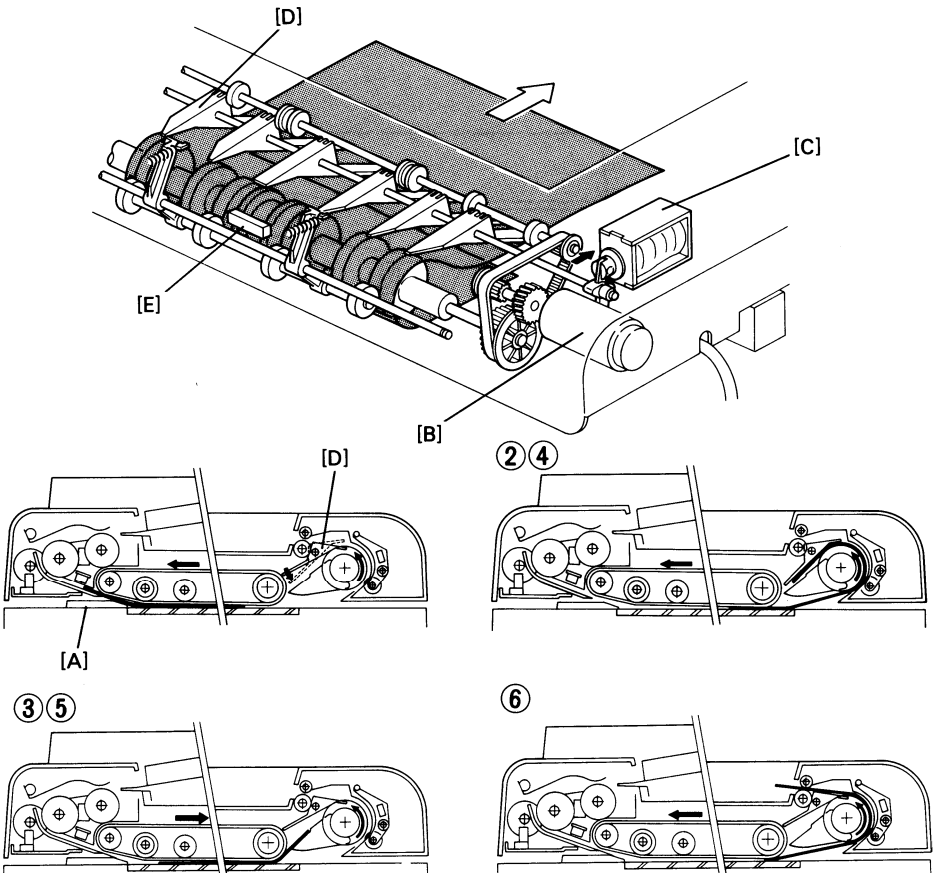
8.4 ORIGINAL SIZE DETECTION



The DF determines original size (both width and length) through the use of the original width sensor [A], registration sensor, and pulse generator sensor **[B]. The original's length is calculated by counting the number of pulses from the pulse generator while the registration sensor is on.**

Original size detection is necessary for the feed-in/feed-out timing of the DF.

8.5 ORIGINAL INVERSION MECHANISM



The two sided originals are inverted in the feed-out unit.

1) When the copier Start key is pressed, the two sided original is fed into the feed-in unit, passing over the DF registration sensor [A]. The feed-out motor [B] and the inverter solenoid [C] turn on 100 milliseconds after the original trailing edge passes the registration sensor. When the inverter solenoid turns on, the inverter pawls [D] rotate counterclockwise.

2) The original is passes over the exposure glass and feeds into the feed-out unit.

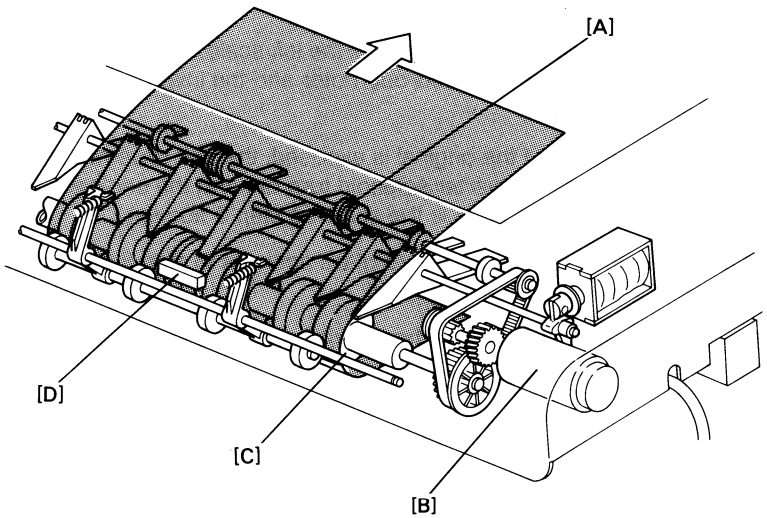
3) The original is directed onto the exposure glass again by the inverter pawls. The belt drive motor now reverses 140 milliseconds after the feed out sensor [E] turns on. The transport belt then moves the original toward the left scale. Slightly before the original reaches the left scale, the belt drive motor drops to half speed. This is to prevent damaging the edge of the original against the left scale.
When the original leading edge reaches the left scale, the belt drive motor stops. At the same time, the feed-out motor and the inverter solenoid turn off.

4) After the reverse side of the original is exposed, the belt drive motor, the feed-out motor, and the inverter solenoid turn on, and the original is fed into the inverter section. (This is the same as step 2 above.)

5) The original is fed onto the exposure glass again as in step 3 above. The front side of the original is then copied.

6) After the front side of the original has been exposed, the original is fed out from the DF.

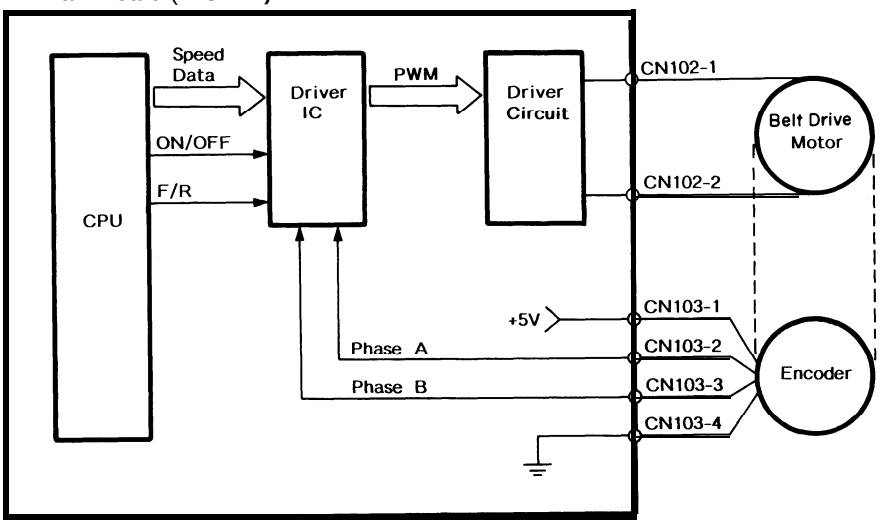
8.6 ORIGINAL FEED-OUT MECHANISM



The exit rollers [A] are driven by inverter motor [B]. When the document feeder receives the feed out signal from the copier, the transport belt and the exit rollers start turning simultaneously. The transport belt carries the original to the inverter rollers [C] and the exit rollers take over the original feed-out. When the original trailing edge passes the feed-out sensor [D], the feed-out motor drops to half of its normal speed for 220 milliseconds and then stops. The lower speed prevents uneven stacking of originals. For A3 or double letter size originals, the feed-out motor speed does not change due to the length of the originals.

8.7 BELT DRIVE MOTOR CIRCUIT

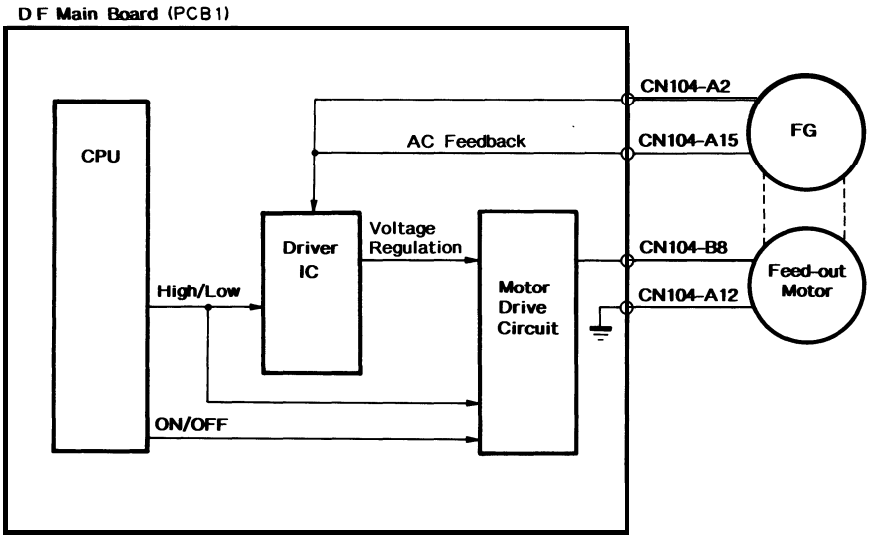
DF Main Board (**PCB 1**)



A dc servomotor is used as the belt drive motor. The driver IC controls the speed of the belt drive motor. The CPU sends the speed data (programmed) to the driver IC. The driver IC sends the pulse-width-modulation (PWM) signal to the driver circuit, which sends the motor drive pulses.

An encoder in the servomotor has two magnetic sensors that generate two pulse signals (phase A and B). The driver IC monitors the belt speed and direction by these pulse signals and uses this data to regulate the motor's speed.

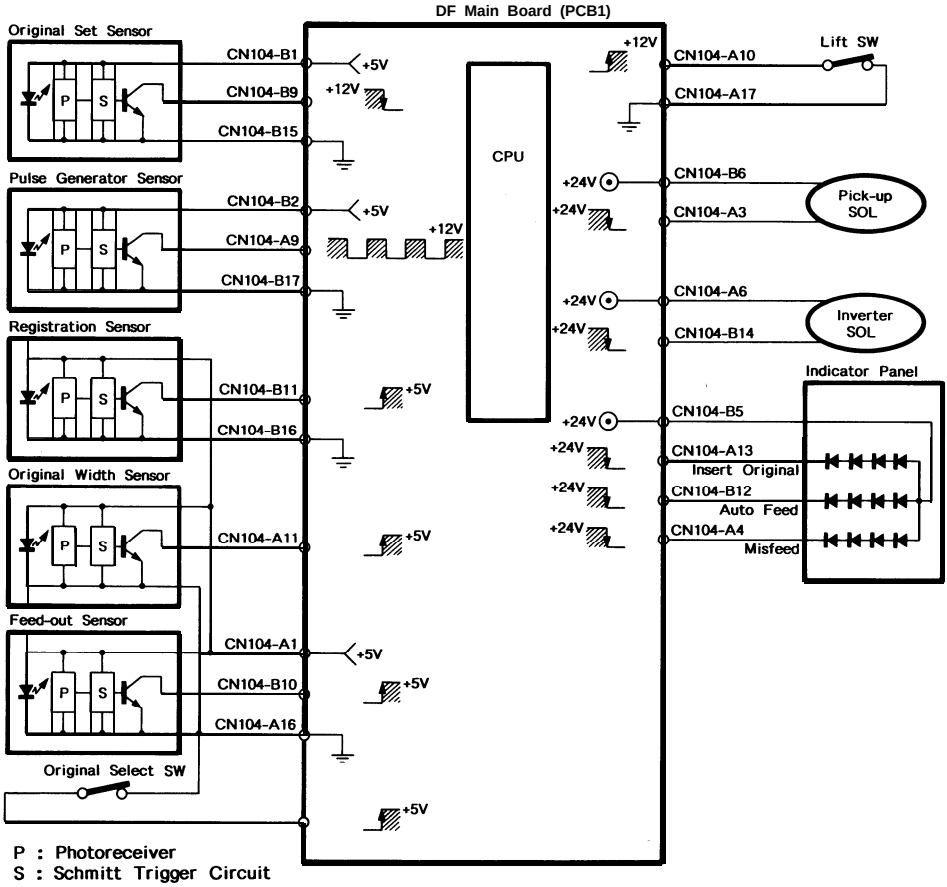
8.8 FEED-OUT MOTOR CIRCUIT



The DF CPU sends the speed data (high or low) to the driver IC and the motor drive circuit. The motor drive circuit creates the PWM signal and sends the motor drive pulses to the inverter motor.

The frequency generator of the feed-out motor makes a very low voltage ac current which is fed back to the driver IC. The driver IC monitors the frequency of this ac current and based on the frequency it regulates the motor speed.

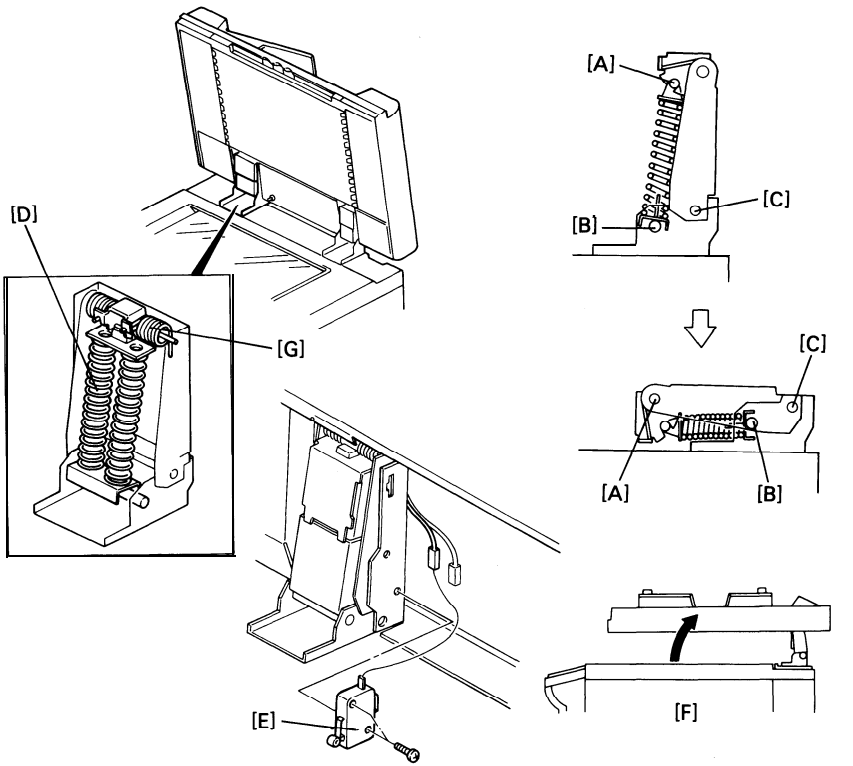
8.9 INPUT AND OUTPUT CIRCUITS



The above devices are directly controlled and monitored by the CPU. The solenoids and indicator panel are energized with +24 volts. The sensors and switches are energized with +12 volts or + 5 volts.

To energize a solenoid or indicator, the CPU drops the connected trigger line from +24 volts to LOW. The CPU monitors the input lines of the sensors and switch to determine when they are activated.

9. LIFT MECHANISM



When the document feeder is opened, the lift springs [D] provide enough force to ensure that the document feeder does not fall onto the exposure glass. When the document feeder is closed, points "A", "B", and "C" are aligned and no such force is provided to the document feeder.

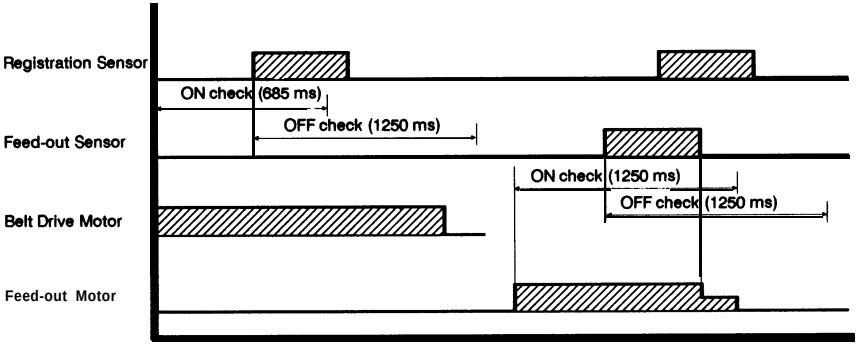
The lift switch [E] is actuated when the document feeder is closed. The copier then shifts to the document feeder mode. The lift switch also serves as the the reset switch for document feeder misfeeds.

When a book or thick (maximum thickness 60 mm) original is copied, the DF acts as a cover for the original as shown in the figure [F]. The lift switch is turned off during this condition, so the DF does not function. The tension of spring [G] returns the DF to the normal condition after copying a thick original.

10. ORIGINAL MISFEED SENSING

The registration sensor and the feed-out sensor are used for misfeed checks.

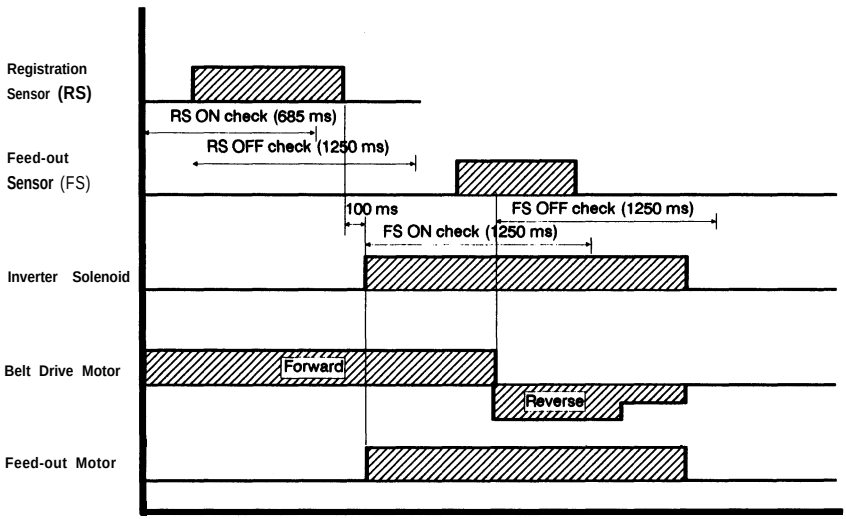
1. One sided original



If the registration sensor is not actuated within 685 milliseconds after the belt drive motor starts turning, the Original Misfeed indicator lights (ON check).

If the registration sensor does not turn off within 1,250 milliseconds, the CPU determines that there has been an original misfeed (OFF check). The Original Misfeed indicator also lights if the feed-out sensor is not actuated within 1,250 milliseconds after the feed-out motor starts turning (ON check) or if the feed-out sensor does not turn off within 1,250 milliseconds after the feed-out sensor is actuated (OFF check).

2. Two sided original



The registration ON/OFF check is same as for one-sided originals. The inverter motor and the inverter solenoid turn on 100 milliseconds after the registration sensor turns off. If the feed-out sensor is not actuated within 1,250 milliseconds after the feed-out motor starts turning, the Original Misfeed indicator lights (ON check). The Original Misfeed indicator also lights if the feed-out sensor does not turn off within 1,250 milliseconds after the belt drive motor reverses (OFF check).

If a previous original remains on the exposure glass after manual copying and DF feed is attempted, the original misfeed indicator lights. When the DF is lifted and the previous original is removed, DF copying is permitted.

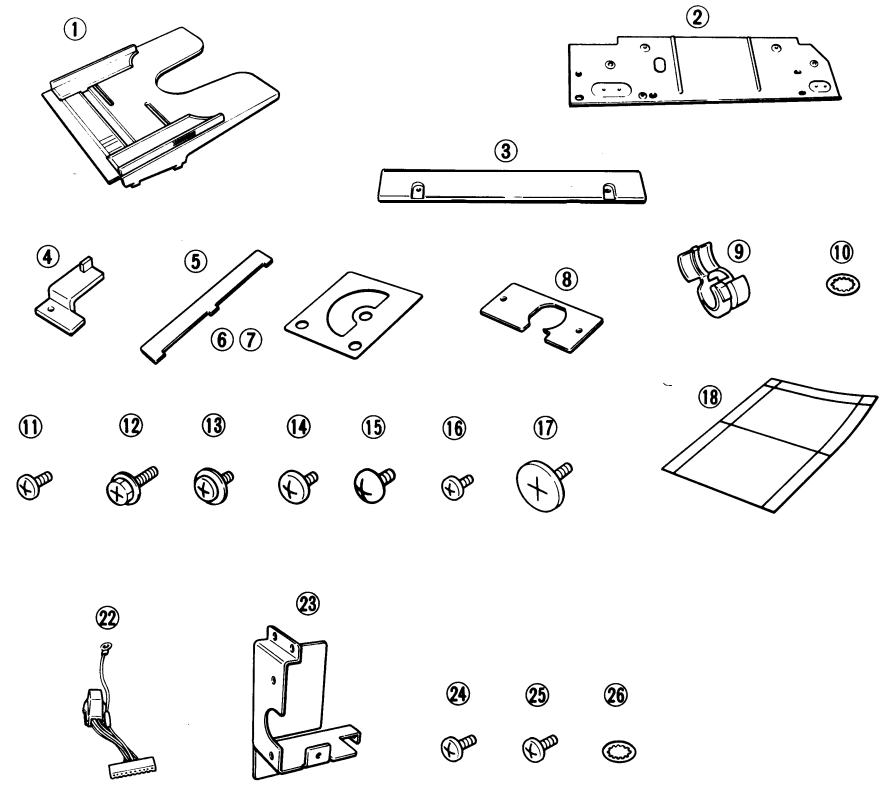
11. ACCESSORY CHECK

Check the accessories and their quantities according to the following list:

1. Original Table ..... 1 pc
2. DF Mounting Bracket ..... 1 pc
3. Angle Stopper ..... 1 pc
4. Lift Switch Actuator ..... 1 pc
5. E Plate ..... 1 pc
6. Spacer – 0.5 mm ..... 4 pcs
7. Spacer – 0.2 mm ..... 4 pcs
8. DF Harness Bracket ..... 1 pc
9. Bushing ..... 1 pc
10. Toothed Washer ..... 1 pc
11. Grounding Screw – M4 x 6 ..... 1 pc
12. Hexagon Head Screw – M4 x 10 ..... 4 pcs
13. Philips Screw with Flat Washer – M4 x 5 ..... 4 pcs
14. Philips Pan Head Screw – M4 x 5 ..... 2 pcs
15. Philips Pan Head Screw – M4x5 ..... 2 pcs
16. Philips Pan Head Screw – M3x5 ..... 1 pc
17. Stud Screw ..... 2 pcs
18. DF Test Sheet ..... 1 pc
19. Installation Procedure ..... 1 pc
20. N. E.C.R ..... 1 pc
21. Envelope for N. E.C.R. (115V only) ..... 1 pc

When installing the DF, the power supply unit (option) is also required.
Check the accessories and their quantities according to the following list:

22. Power Supply Unit Harness ..... 1 pc
23. Harness Mounting Bracket ..... 1 pc
24. Philips Pan Head Screw – M4 x6 ..... 5 pcs
25. Grounding Screw – M4 x 6 ..... 1 pc
26. Toothed Washer ..... 1 pc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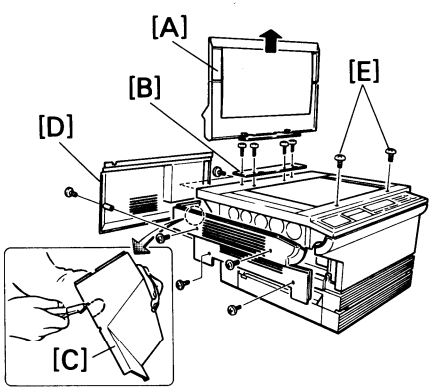
12. INSTALLATION PROCEDURE

CAUTION: When installing the DF, make sure that the copier is unplugged.

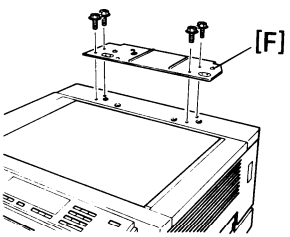


1. Remove the following parts of the copier:

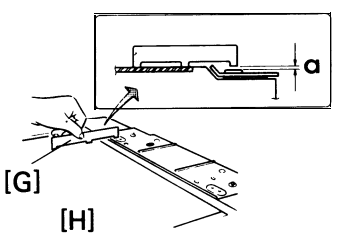
1) Platen cover [A] (2 push-locks)
2) Platen cover pedestal [B] (4 screws)
3) Upper left cover [C] (4 screws)

NOTE: Cut the harness hole cap with nippers.

4) Upper rear cover [D] (2 screws)
5) 2 screws for fixing the operation panel [E].



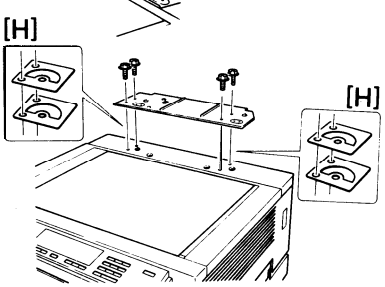
2. Secure the DF mounting bracket [F] (4 screws [12]).



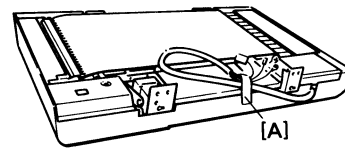
3. Adjust the height of the DF mounting bracket in the following order:

1) **Set the E plate [G] on the exposure glass as shown and measure the clearance "a" between the DF mounting bracket and the E plate.**

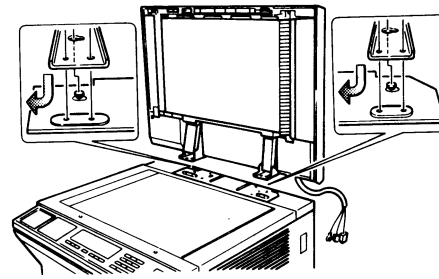
2) **Remove the DF mounting bracket and insert the spacers [H] to make clearance "a" between 0 mm and 0.3 mm.**



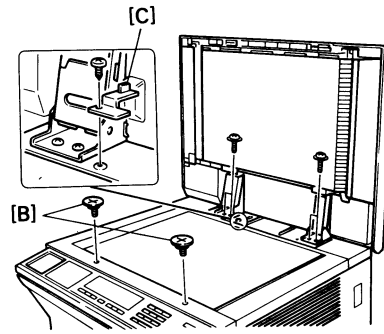
4. Remove the strip of tape [A].

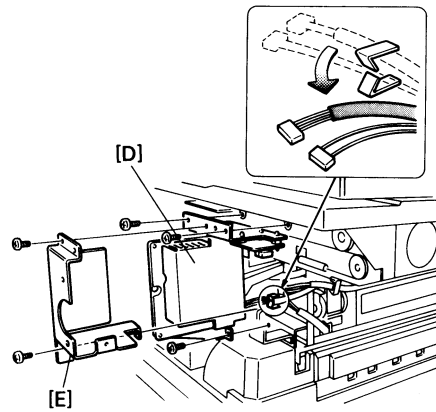


5. Mount the DF on the DF mounting bracket by aligning the holes in the DF and the pins on the mounting bracket, then slide the DF to the left as shown.



6. Secure the DF to the DF mounting bracket (4 screws [13]).
7. Install the 2 stud screws [B] as shown in the figure.
8. Install the lift switch actuator [C] (1 screw [16]).
9. Pull out the interface harness connector (red, 4p) and the ac harness connector (black, 2P) from the wire clamp.
10. Install the power supply unit [D] (3 screws).
11. Install the harness mounting bracket [E] (2 screws [21]).

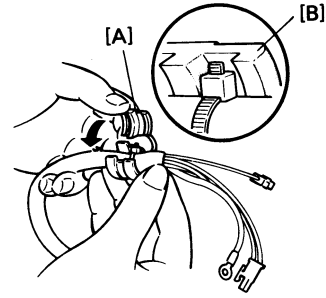




NOTE: See illustration for correct installation. There are three holes; however, the top right hole is used to fix the ground wire of the DF harness.

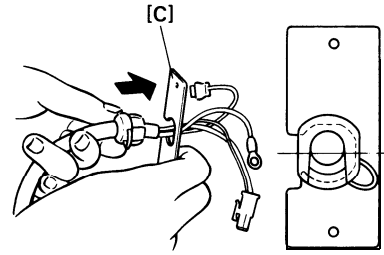
CAUTION: During this step, avoid bending the fiber optics sharply as this will damage them.

12. Place the bushing [A] over the DF harness just at the harness band [B].



13. Secure the bushing in the DF harness bracket [C].

14. Install the DF harness bracket on the harness mounting bracket (2 screws [15]).

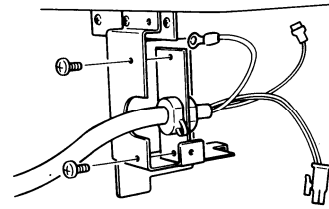


15. Couple the five connectors as follows:

    1) Fiber optics - CN251

    2) Interface harness connector (red) ↔ CN252

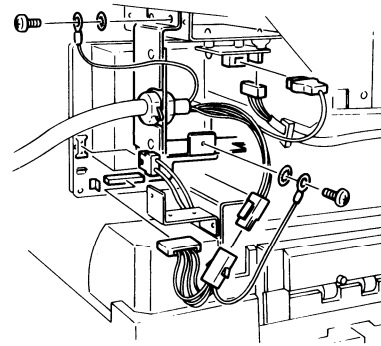
    3) AC harness connector (black) ↔ CN203



NOTE: Remove the tape from the ac harness connector.

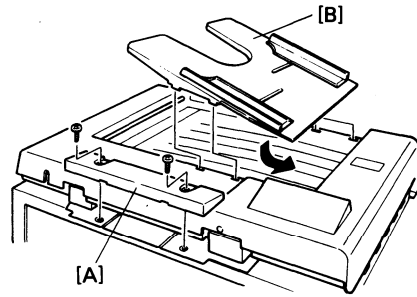
    4) Power supply unit harness connector (brown) ↔ CN201

    5) Power supply unit connector (white) ↔ DF harness connector (white).



16. Secure the two grounding wires together with the two toothed washers (1 screw each [11] [22]).

17. install the angle stopper [A] (2 screws [14]).
18. Install the original table [B].

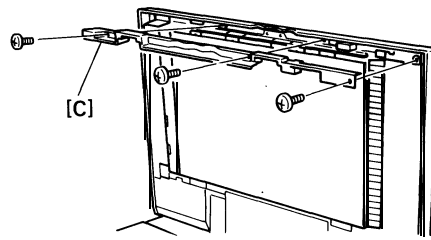


19. Adjust the height of the magnet catches in the following order:

    1) Remove the grip cover [C] (3 screws).

    2) Loosen the screws of the magnet catches [D] (2 screws each).

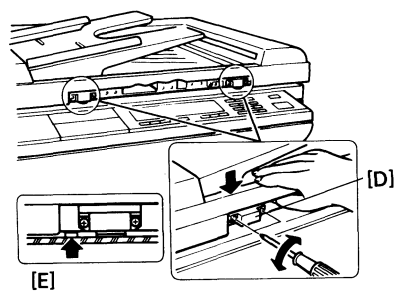
    3) Close the document feeder and tighten the screws of the magnet catches when the rubber stopper [E] contacts the exposure glass.



20. Reinstall the grip cover (3 screws).

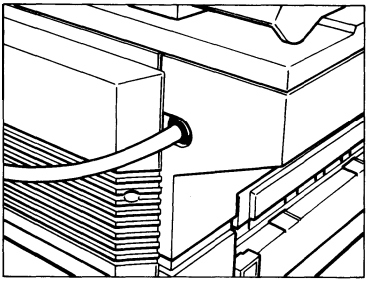
NOTE: Open and close the document feeder to confirm that the magnet catches are making good contact.

21. Plug in the copier and turn on the main switch.



22. Confirm the original registration (see adjustments section).

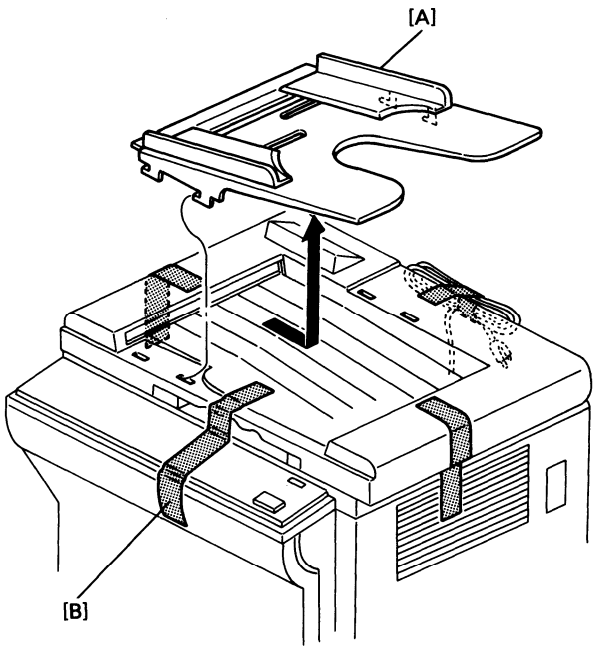
23. Reassemble the copier. (The DF harness fits in the cut-out in the upper left cover.)



24. Check the operation of the DF and fill out the New Equipment Condition Report.

25. Position the original select switch to the thin paper mode (normal position) and explain the function of this switch to the customer.

13. PREPARATION FOR TRANSPORTATION



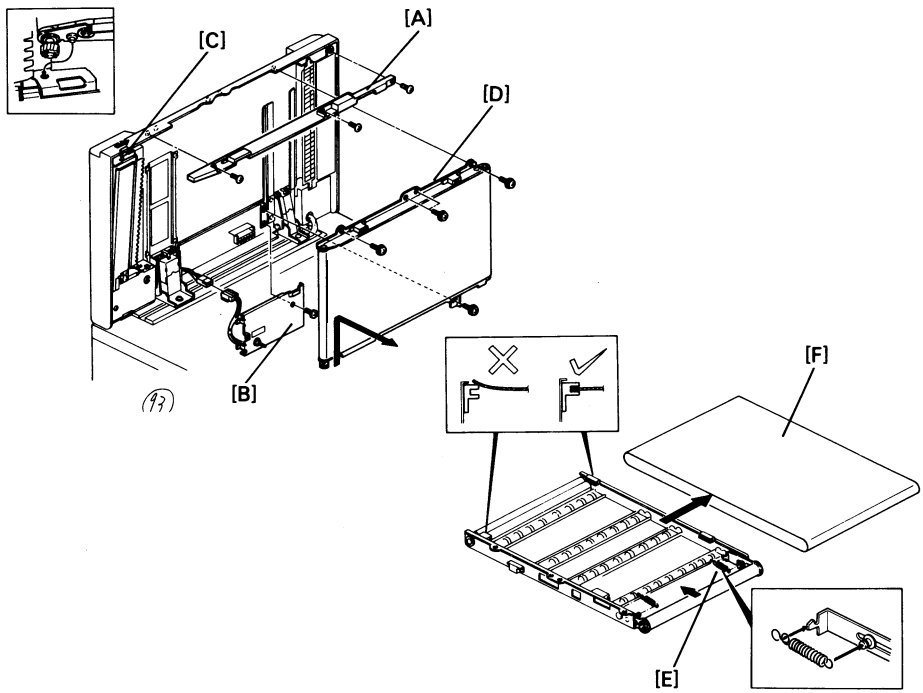
CAUTION: Before moving the document feeder, be sure to prepare it for transportation as follows. The document feeder maybe badly damaged if it is moved without proper preparation.

1. Remove the original table [A].
2. Secure the document feeder with strips of tape [B] as shown in the illustration.

14. REPLACEMENT AND ADJUSTMENT

14.1 FEED-IN UNIT

14.1.1 Transport Belt Replacement

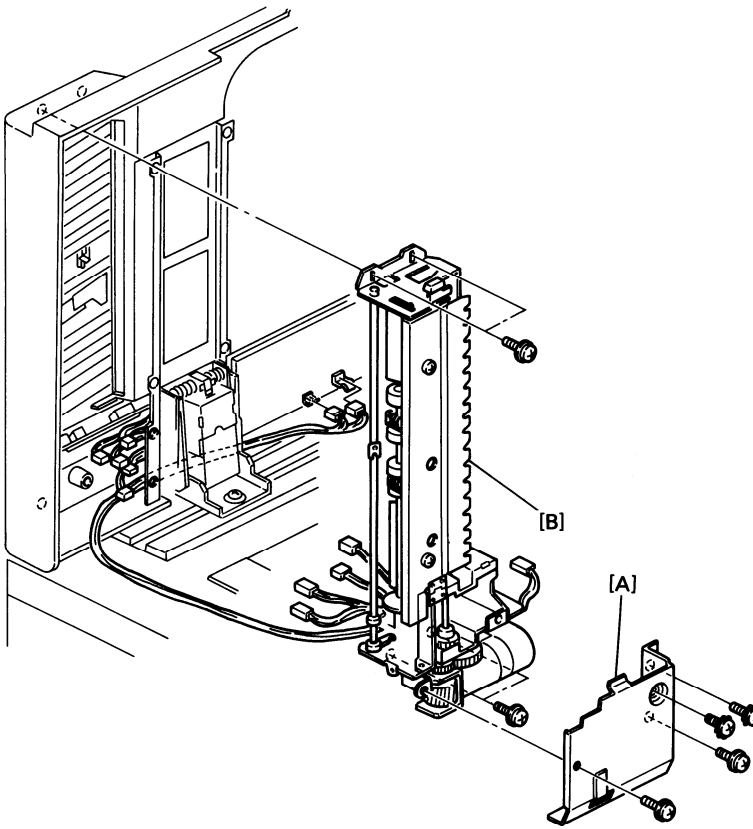


1. **Turn off the main switch and remove the grip [A] (3 screws).**
2. **Remove the DF main PCB cover [B] (1 screw, 1 connector).**
3. **Open the entrance guide [C] and remove the transport belt assembly [D] (5 screws).**
4. **Remove the 2 tension springs [E] and pull off the transport belt [F].**

NOTE: a) When installing the transport belt, make sure the belt lies between the belt guide spacers [G].

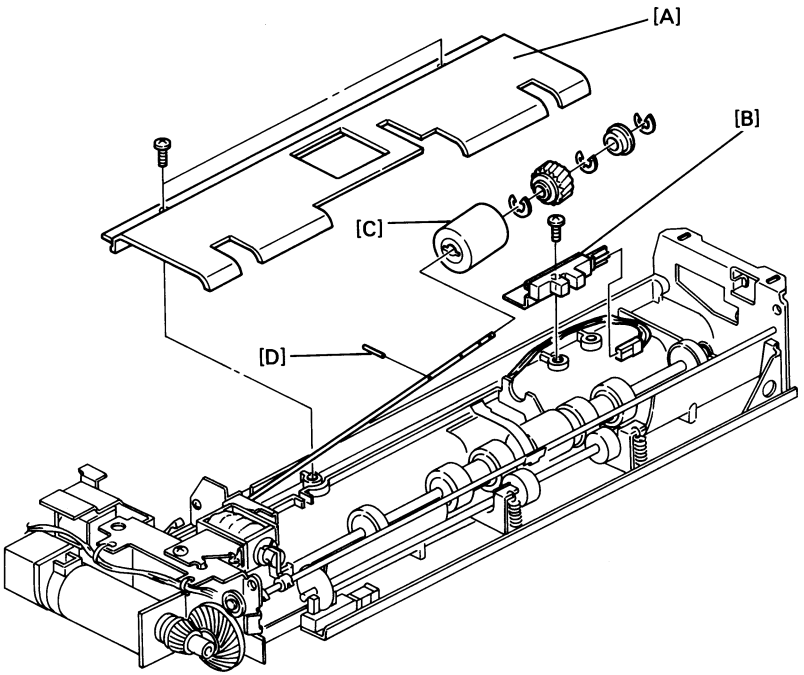
b) When installing the transport belt assembly, make sure the positioning pin correctly fits in the DF frame, and hold open the exit guide to prevent the mylar strip from becoming damaged.

14.1.2 Feed-in Unit Removal



1. Turn off the main switch.
2. Remove the transport belt assembly. (See the Transport Belt Replacement section.)
3. Remove the belt drive motor cover [A] (4 screws).
4. Remove the feed-in unit [B] (4 screws, 8 connectors).

14.1.3 Pick-up Roller Replacement



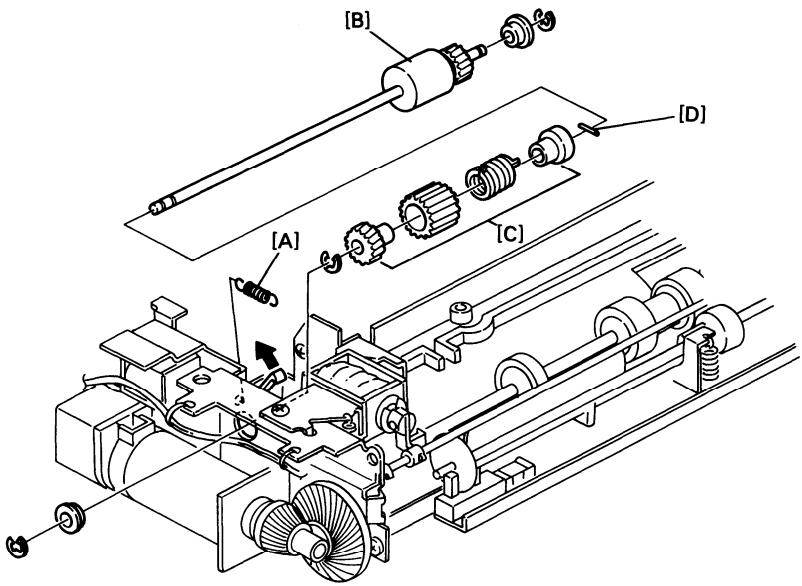
1. Turn off the main switch.
2. Remove the feed-in unit. (See the Feed-in Unit Removal section.)
3. Remove the lower entrance guide [A] (2 screws).
4. Remove the original set sensor assembly [B] (1 screw, 1 connector).
5. Remove the pick-up roller [C] (3 E-rings, 1 bushing, 1 gear).

NOTE: a) Be careful not to loose the pin [D].

b) When installing the roller, make sure the positioning pin is correctly inserted in the cut-out of the roller.

c) When installing the gear, make sure the flat side of the gear is facing away from the roller.

14.1.4 Feed-in Clutch Lubrication

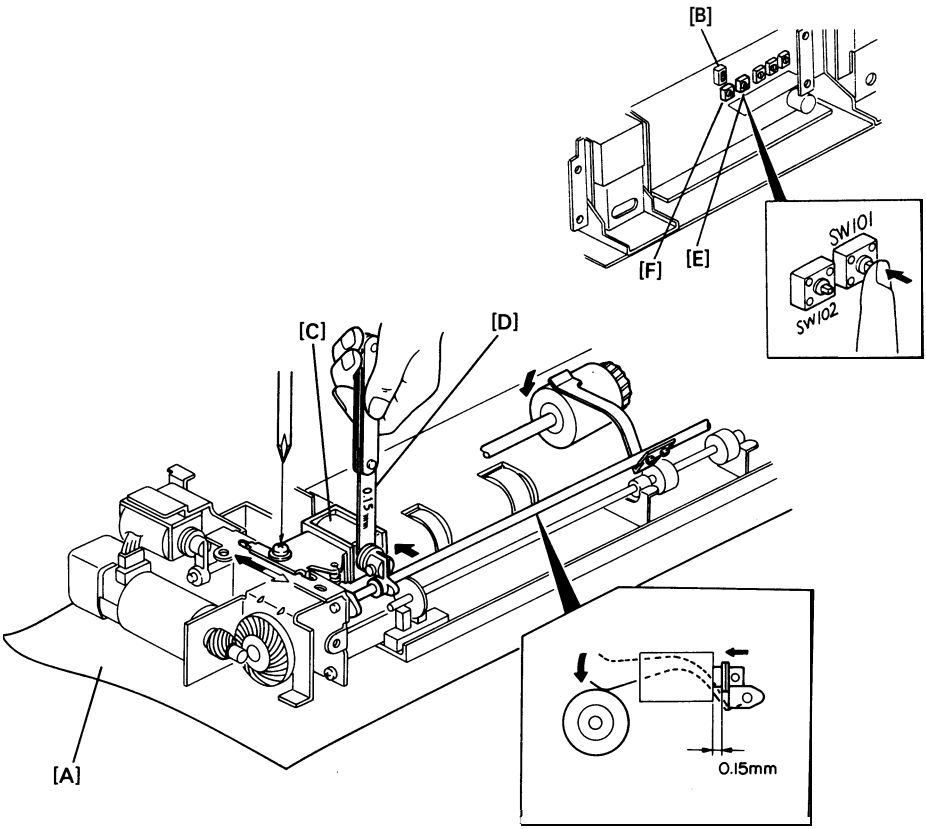


1. Turn off the main switch.
2. Remove the original set sensor assembly. (See the Pick-up Roller Replacement section.)
3. Remove the feed-in solenoid lever spring [A].
4. Remove the pick-up roller assembly [B] (2 E-rings, 2 bushings).
5. Disassemble and lubricate the feed clutch [C] (1 E-ring) with Mobil Temp. 78.

NOTE: a) Be careful not to loose the pin [D].

b) When installing the feed clutch, make sure the positioning pin is correctly inserted in the cut-out of the clutch.

14.1.5 Pick-up Solenoid Adjustment



1. Turn off the main switch.
2. Place several sheets of paper [A] over the exposure glass area.
3. Lower the feed-in unit (see Feed-in Unit Removal section) without disconnecting the eight connectors.
4. Turn on the main switch.

NOTE: When the main switch is turned on, the DPS101 setting on the DF main PCB must be as follows:

1 = ON3 = OFF
2 = ON4 = OFF

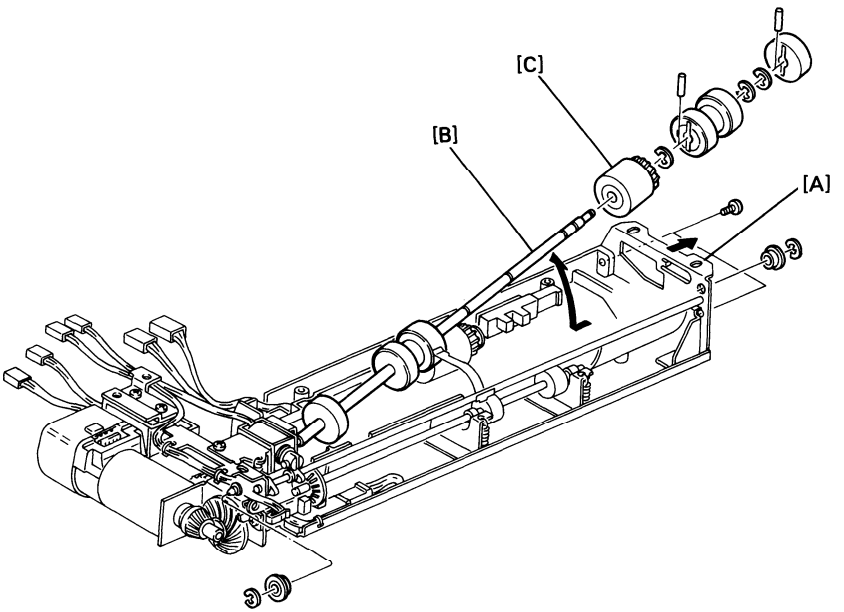
This is so that the initial check sequence can take place.

5. Turn off DPS101 -1 and 2, then turn on DPS101 -3 and 4 [B].
6. Loosen the screw fixing the pick-up solenoid [C].
7. Place the 0.15 mm thickness gauge [D] between the plunger and the solenoid.
8 While holding the solenoid, press SW101 [E] on the DF main PCB to engage all DF solenoids.
9. Holding the solenoid securely, move it slowly towards the left, until the plunger is attracted to the solenoid. Just at this point, tighten the screw.

NOTE: Make sure the pick-up lever is touching the pick-up roller during this adjustment.

10. Press SW 102 [F] to turn off the solenoids.
11. Turn off DPS101-3 and 4, then turn on DPS101-1 and 2.
12. Turn off the main switch and reassemble the DF.
13. Check the original feed-in operation.

14.1.6 Feed Roller Replacement



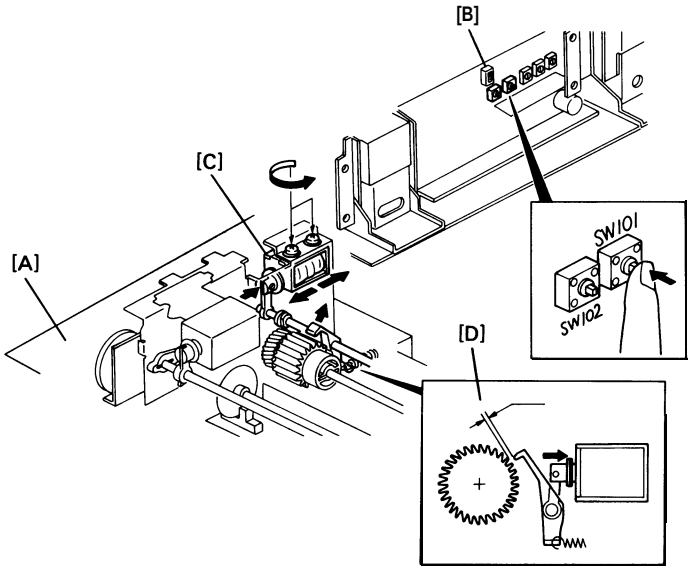
1. Turn off the main switch.
2. Remove the lower entrance guide. (See the Pick-up Roller Replacement section.)
3. Loosen the front bracket [A] (2 screws).
4. Release the feed roller shaft [B] from the front bracket (1 E-ring, 1 bearing).
5. Remove the feed roller [C] (3 E-rings, 1 side roller, 1 pull-out roller).

NOTE: a) Take care not to lose the pins.

b) When installing the feed roller, make sure the gear side of the roller faces the front (see illustration).

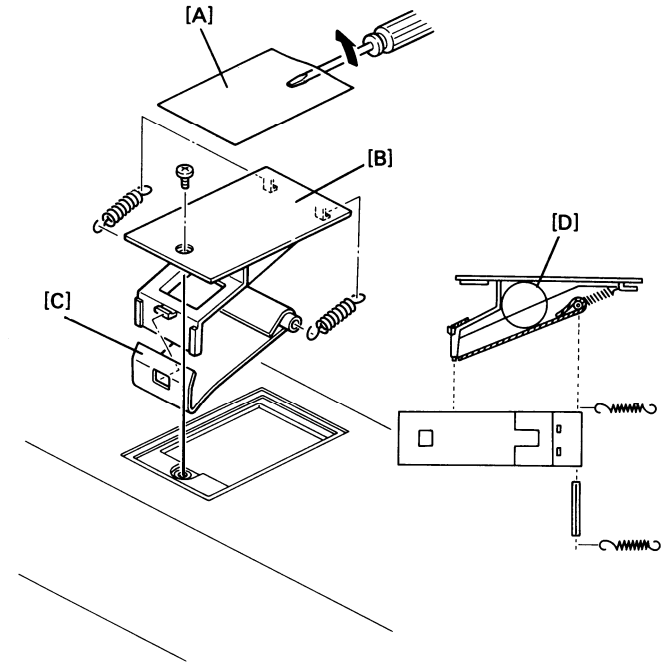
c) When installing the side and pull-out rollers, make sure the pins are correctly inserted in the cut-outs of the rollers.

14.1.7 Feed-in Solenoid Adjustment



1. Turn off the main switch.
2. Place several sheets of paper [A] over the exposure glass area.
3. Lower the feed-in unit (see Feed-in Unit Removal section) without disconnecting the eight connectors.
4. Check that DPS101 is set for the normal mode (1 = ON, 2 = ON, 3 = OFF, 4 = OFF).
5. Turn on the main switch.
6. Turn off DPS101-1 and 2, then turn on DPS101-3 and 4 [B].
7. Loosen the 2 screws securing the feed-in solenoid [C].
8. Press SW101 on the DF main PCB (to engage all DF solenoids) and adjust the position of the solenoid until the gap [D] (see illustration) is within 1.0- 2.0 mm.
9. Press SW102 on the DF main PCB to turn off all DF solenoids.
10. Turn off DPS101 -3 and 4, then turn on DPS101-1 and 2.

14.1.8 Friction Belt Replacement



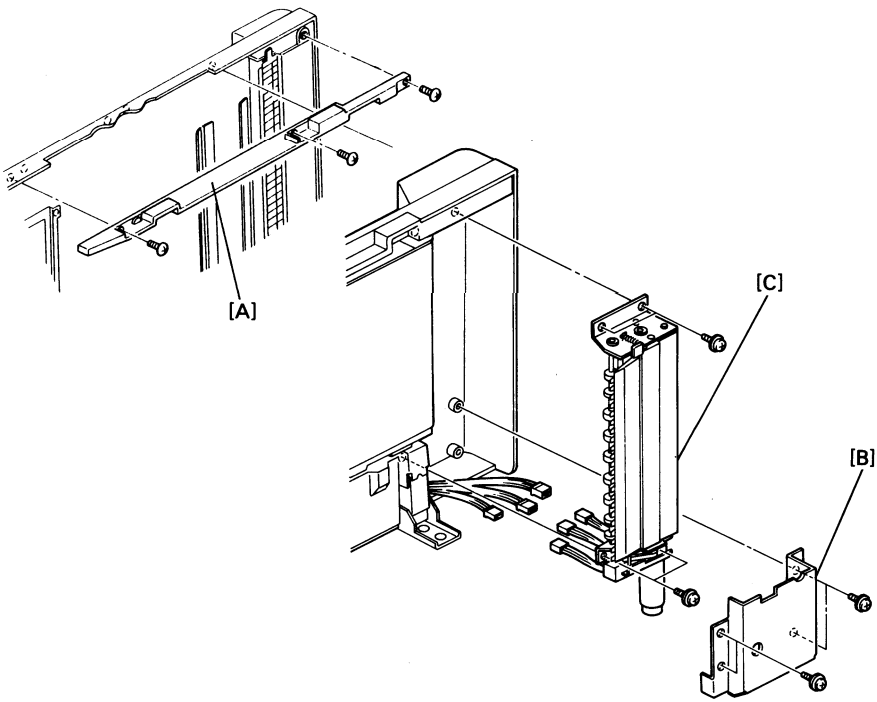
1. Turn off the main switch.
2. Remove the seal cover [A] on top of the DF cover.
3. Remove the friction belt assembly [B] (1 screw).
4. Remove the friction belt [C] (2 springs, 1 pin).

NOTE: a) When installing the friction belt assembly, make sure the friction roller [D] is set in the correct position (see illustration).

b) If the seal cover becomes dirty or deformed, replace it with a new one.

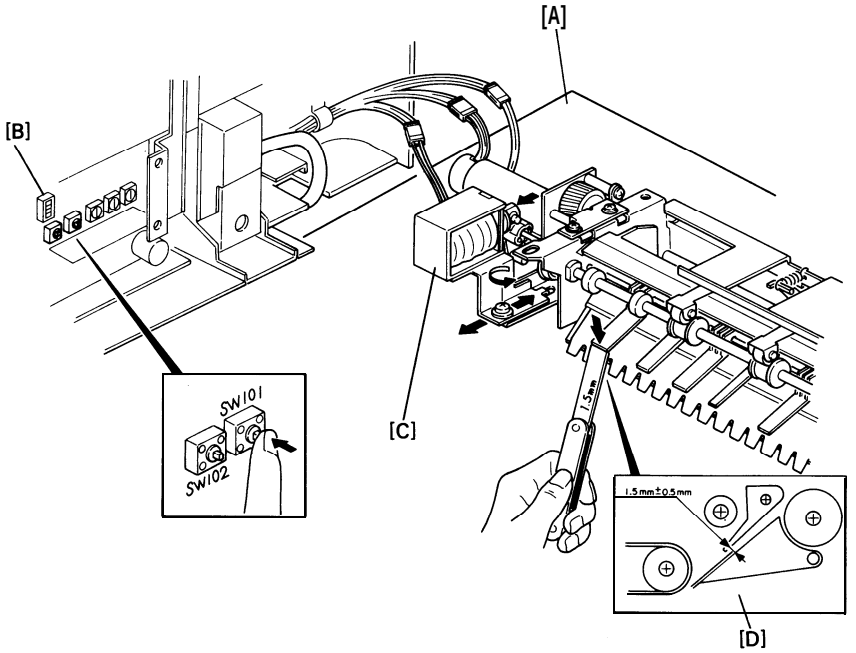
14.2 FEED-OUT UNIT

14.2.1 Feed-out Unit Removal



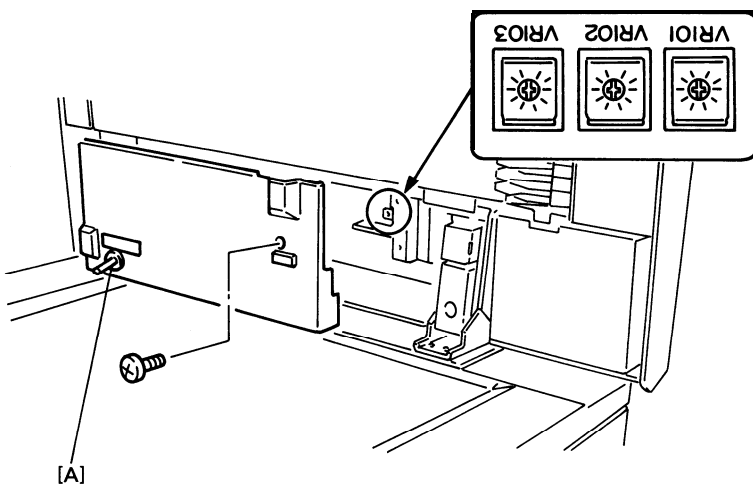
1. **Turn off the main switch.**
2. **Remove the DF grip [A] (3 screws).**
3. **Remove the feed-out motor cover [B] (4 screws).**
4. **Remove the feed-out unit [C] (4 screws, 3 connectors).**

14.2.2 Inverter Solenoid Adjustment



1. Turn off the main switch.
2. Place several sheets of paper [A] over the exposure glass area.
3. Lower the feed-out unit (see Feed-out Unit Removal section) without disconnecting the three connectors.
4. Check that the DPS101 is set for the normal mode (1 = ON,2 = ON, 3 = OFF, 4 = OFF).
5. Turn on the main switch.
6. Turn off DPS101-1 and 2, then turn on DPS101-3 and 4 [B].
7. Loosen the screw securing the inverter solenoid [C].
8. Press SW101 on the DF main PCB (to engage all DF solenoids), and adjust the position of the solenoid until the gap [D] (see illustration) is within 1.5 ±0.5 mm.
9. Press SW102 on the DF main PCB to turn off all DF solenoids.
10. Turn off DPS101 -3 and 4, then turn on DPS101 -1 and 2.

14.2.3 DFL eading Edge Registration Adjustment



1. **Using the DF test chart, make a copy in the platen cover mode (A4 width).**
2. **Confirm that the original select switch [A] is in the thin mode and again using the test chart, make a copy in the DF mode (A4 width).**
3. **Compare the leading edge registration of both copies, and check that the difference between the two copies is within 2.5 mm.**

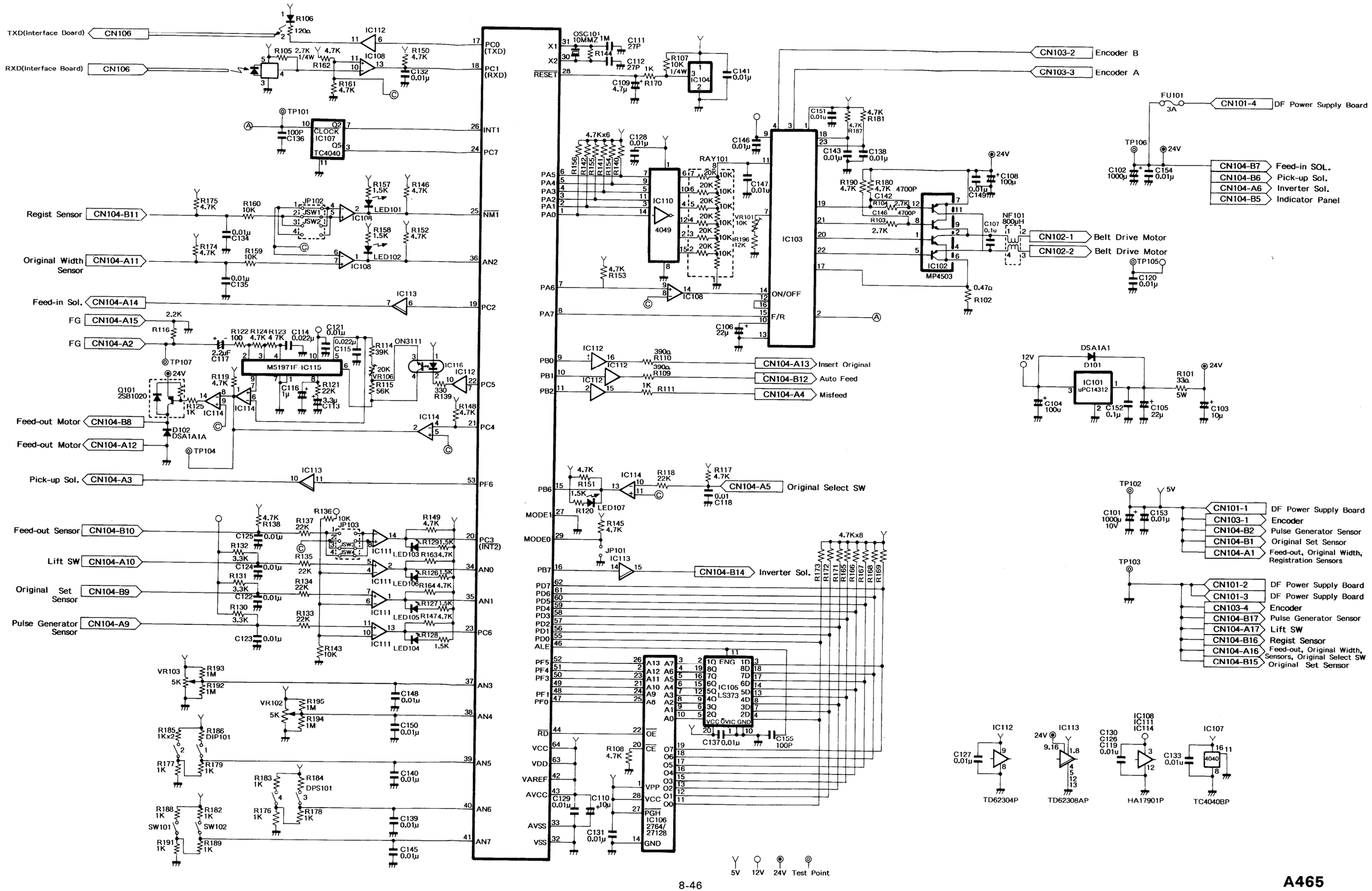
4. If the difference is more than 2.5mm, remove the DF main PCB cover(1 screw) and adjust VR102 on the DF main PCB [B] until the leading edge registration is within specification.

NOTE: Turning VR102 clockwise results in stopping the original later.

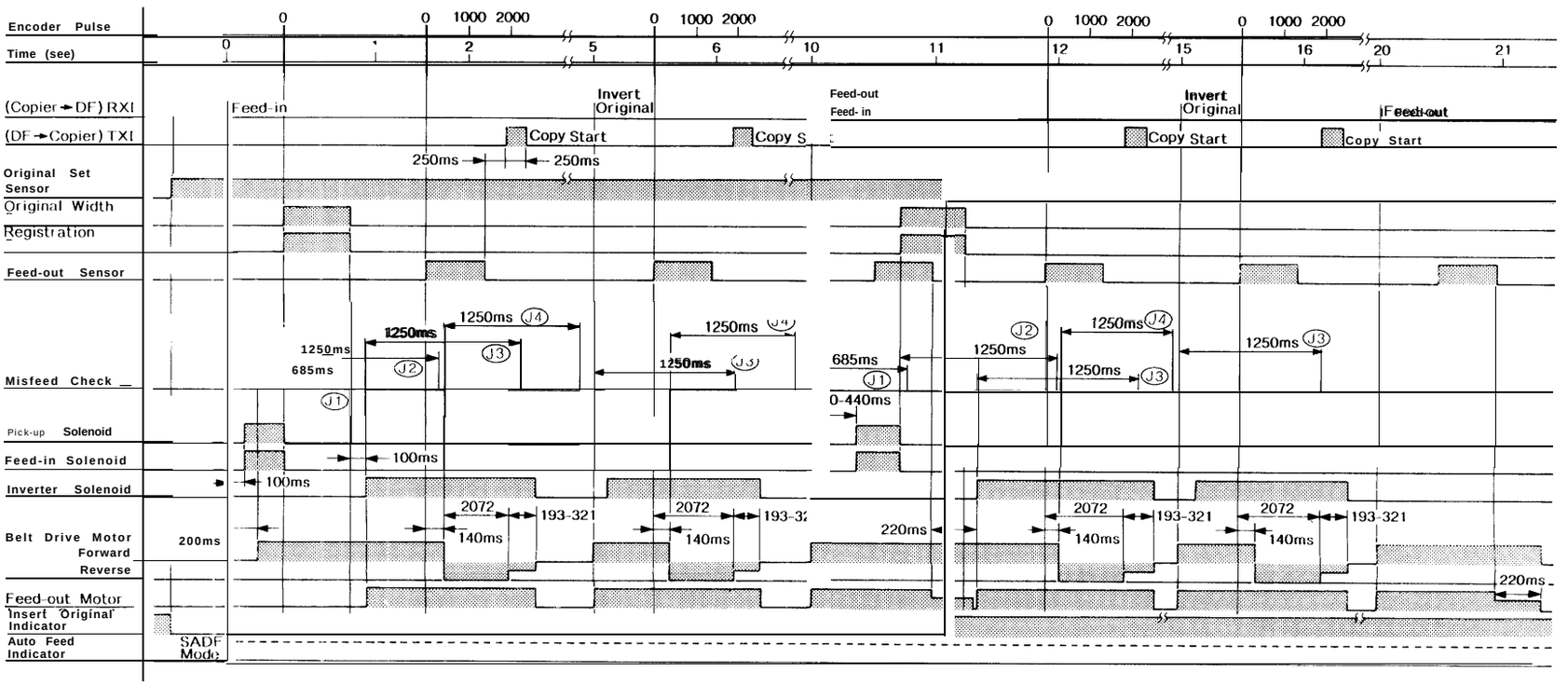
5. Using the DF test chart, make a copy in the DF two sided-original mode. (Insert the original face down.)
6. Compare the leading edge registration with that of the platen cover mode copy, and check that the difference between the two copies is within 2.00 mm.
7. If out of specification, adjust VR103 on the DF main PCB [B] until the leading edge registration is correct.

NOTE: a) The test sheet stops pressed against the left scale in DF two-sided original mode.

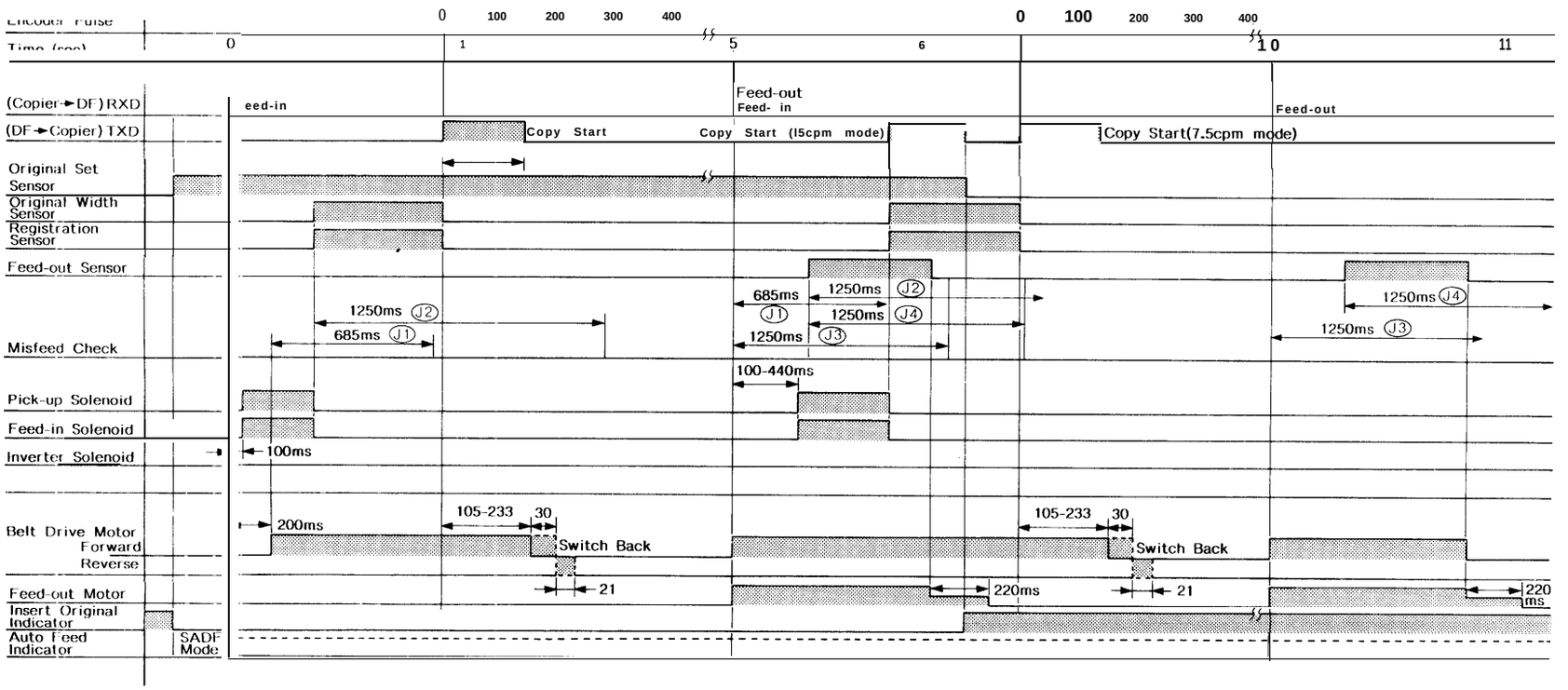
b) Turning VR103 clockwise results in the original stopping later.


TXD(Interface Board) CN106
RXD(Interface Board) CN106
R106 120Ω
IC112
IC108
R105 2.7K 1/4W
R162 4.7K
R150 4.7K
C132 0.01µ
R161 4.7K
PC0 (TXD)
PC1 (RXD)
TP101
Q2 CLOCK IC107 Q5 TC4040
100P C136
INT1
PC7
Regist Sensor CN104-B11
Original Width Sensor CN104-A11
R175 4.7K
R174 4.7K
R160 10K
R159 10K
0.01µ C134
0.01µ C135
JP102
JSW1
JSW2
R157 1.5K
R158 1.5K
R146 4.7K
R152 4.7K
LED101
LED102
IC108
NM1
AN2
Feed-in Sol. CN104-A14
IC113
PC2
FG CN104-A15
FG CN104-A2
2.2K R116
R122 100
R124 4.7K
R123 4.7K
C114 0.022µ
C121 0.01µ
2.2µF C117
M51971F IC115
R114 39K
20K VR106
R115 56K
ON3111
IC116
IC112
330 R139
R148 4.7K
PC5
TP107
24V
Q101 2SB1020
R119 4.7K
R125 1K
IC114
C116 1µ
R121 22K
3.3µ C113
Feed-out Motor CN104-B8
Feed-out Motor CN104-A12
D102 DSA1A1A
TP104
PC4
Pick-up Sol. CN104-A3
IC113
PF6
Feed-out Sensor CN104-B10
Lift SW CN104-A10
Original Set Sensor CN104-B9
Pulse Generator Sensor CN104-A9
4.7K R138
C125 0.01µ
R132 3.3K
C124 0.01µ
R131 3.3K
C122 0.01µ
R130 3.3K
C123 0.01µ
R136 10K
JP103
JSW3
JSW4
R137 22K
R135 22K
R134 22K
R133 22K
R143 10K
IC111
LED103
LED106
LED105
LED104
R149 4.7K
R129 1.5K
R163 4.7K
R126 1.5K
R164 4.7K
R127 1.5K
R147 4.7K
R128 1.5K
PC3 (INT2)
AN0
AN1
PC6
VR103 5K
R193 1M
R192 1M
VR102 5K
R195 1M
R194 1M
C148 0.01µ
C150 0.01µ
C140 0.01µ
C139 0.01µ
C145 0.01µ
AN3
AN4
AN5
AN6
AN7
R185 1Kx2
R186 DIP101
R177 1K
R179 1K
R183 1K
R184 DPS101
R176 1K
R178 1K
R188 1K
R182 1K
SW101
SW102
R191 1K
R189 1K
X1
X2
RESET
OSC101 10MMZ
1M R144
C111 27P
C112 27P
C109 4.7µ
1K R170
R107 10K 1/4W
IC104
C141 0.01µ
PA5
PA4
PA3
PA2
PA1
PA0
4.7Kx6
R156
R142
R155
R141
R154
R140
C128 0.01µ
IC110 4049
RAY101
20K 10K
VR101 10K
IR196 12K
4.7K R153
PA6
PA7
IC108
C106 22µ
IC103
C146 0.01µ
C151 0.01u
4.7K R181
4.7K R187
C143 0.01µ
C138 0.01µ
C147 0.01u
ON/OFF
F/R
PB0
PB1
PB2
IC112
390Ω R110
390Ω R109
1K R111
CN104-A13 Insert Original
CN104-B12 Auto Feed
CN104-A4 Misfeed
4.7K R151
1.5K R120
LED107
IC114
R118 22K
R117 4.7K
CN104-A5 Original Select SW
0.01 C118
MODE1
MODE0
R145 4.7K
JP101
IC113
PB7
CN104-B14 Inverter Sol.
4.7Kx8
R173
R172
R171
R165
R166
R167
R168
R169
PD7
PD6
PD5
PD4
PD3
PD2
PD1
PD0
ALE
PF5
PF4
PF3
PF1
PF0
RD
VCC
VDD
VAREF
AVCC
AVSS
VSS
C129 0.01µ
C110 10µ
C131 0.01µ
R108 4.7K
A13 A7
A12 A6
A11 A5
A10 A4
A9 A3
A8 A2
A1
A0
OE
CE
VPP
VCC
PGH
IC106 2764/ 27128
GND
O7 O6 O5 O4 O3 O2 O1 O0
IC105 LS373
1Q ENG 1D
8Q 7D
7Q 6D
6Q 5D
5Q 4D
4Q 3D
3Q 2D
2Q VCC GND 1C
C137 0.01µ
C155 100P
CN103-2 Encoder B
CN103-3 Encoder A
FU101 3A
CN101-4 DF Power Supply Board
TP106
24V
C102 1000µ
C154 0.01µ
CN104-B7 Feed-in SOL.
CN104-B6 Pick-up Sol.
CN104-A6 Inverter Sol.
CN104-B5 Indicator Panel
R180 4.7K 4700P
C142
R104 2.7K
C146 4700P
R103 2.7K
C149 0.01µ
C108 100µ
C107 0.1u
NF101 800µH
IC102 MP4503
0.47Ω R102
CN102-1 Belt Drive Motor
CN102-2 Belt Drive Motor
TP105
C120 0.01µ
DSA1A1
12V
D101
IC101 uPC14312
C104 100u
C152 0.1µ
C105 22µ
R101 33Ω 5W
C103 10µ
TP102
5V
C101 1000µ 10V
C153 0.01µ
CN101-1 DF Power Supply Board
CN103-1 Encoder
CN104-B2 Pulse Generator Sensor
CN104-B1 Original Set Sensor
CN104-A1 Feed-out, Original Width, Registration Sensors
TP103
CN101-2 DF Power Supply Board
CN101-3 DF Power Supply Board
CN103-4 Encoder
CN104-B17 Pulse Generator Sensor
CN104-A17 Lift SW
CN104-B16 Regist Sensor
CN104-A16 Feed-out, Original Width, Sensors, Original Select SW
CN104-B15 Original Set Sensor
IC112
C127 0.01µ
TD62304P
IC113
24V
9.16
1.8
TD62308AP
IC108 IC111 IC114
C130 C126 C119 0.01u
HA17901P
IC107
C133 0.01u
4040
TC4040BP
5V 12V 24V Test Point

[One-sided Original Mode 1



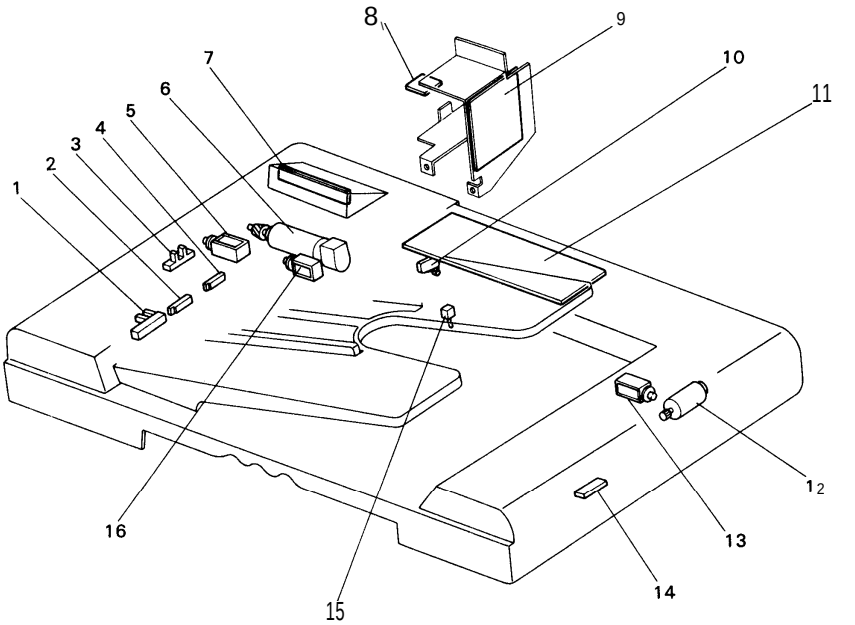
[Two-sided Original Mode]

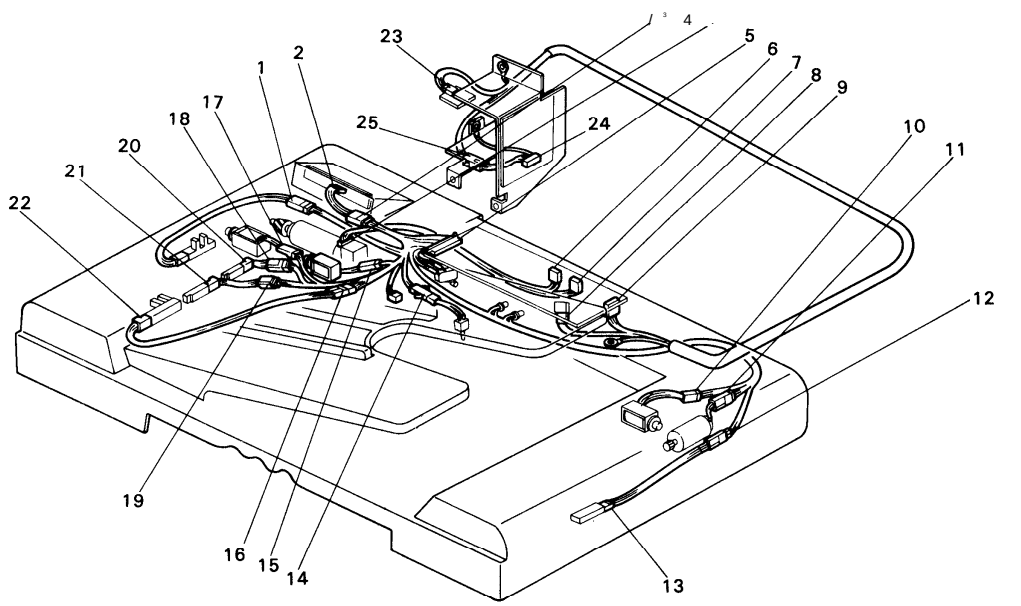


JAM CHECK

- **J1 : Registration Sensor ON Check**
- **J2 : Registration Sensor OFF Check**
- **J3 : Feed-out Sensor ON Check**
- **J4 : Feed-out Sensor OFF Check**

ELECTRICAL COMPONENTS AND CONNECTOR LAYOUT-DF





Index No.	Description	Symbol	P to P
1.	Original Set Sensor	S1	A8
2.	Registration Sensor	S2	A9
3.	Pulse Generator Sensor	S4	A8
4.	Original Width Sensor	S3	A9
5.	Pick-up Solenoid	SOLI	A1O
6.	Belt Drive Motor	M I	A7
7.	Indicator Panel	PCB2	A1O
8.	Interface Board	PCB3	B7-C7
9.	DF Power Supply Board	PCB4	H9
10.	Lift Switch	S W I	A1O
11.	DF Main Board	PCB1	A7-B11
12.	Feed-out Motor	M2	A8
13.	Inverter Solenoid	SOL3	A I I
14.	Feed-out Sensor	S5	A9
15,	Original Select Switch	SW2	A1O
16.	Feed-in Solenoid	SOL2	Al 1

Index No.	CN No.	Component	Symbol	Type	P to P
1.	CN118	–	—	3P/R	A8
2.	CN200	Indicator Panel	PCB2	4P/W	A1O
3.	CN119	–	—	6P/W	A1O
4.	CN111	Belt Drive Motor	M I	6P/W	A7
5.	CN I04	DF Main Board	PCB1	34P/B	A8-A11
6.	CN103	DF Main Board	PCB1	4P/W	A7
7.	CN I02	DF Main Board	PCB1	2P/W	A7
8.	CN106	DF Main Board	PCB1	2P/B	B8
9.	CN101	DF Main Board	PCB1	5P/W	B1 1
10.	CN11O	Inverter Solenoid	SOL3	2P/R	Al 1
11.	CN108	Feed-out Motor	M2	4P/W	A8
12.	CN109	–	—	3P/W	A9
13.	CN119	Feed-out Sensor	S5	3P/W	A9
14.	CN120	Original Select Switch	SW2	2P/W	A1O
15.	CN115	Feed-in Solenoid	SOL2	2P/Y	Al 1
16.	CN116	–	—	3P/W	A8
17.	CN114	Pick-up Solenoid	SOL1	2P/R	A1O
18.	CN121	–	—	3P/W	A9
19.	CN117	–	—	3P/Y	A9
20.	CN31	Original Width Sensor	S3	3P/B	A9
21.	CN27	Registration Sensor	S2	3P/B	A9
22.	CN26	Original Set Sensor	S1	3P/W	A8
23.	CN251	Interface Board	PCB3	2P/B	C7
24.	CN201	DF Power Supply Board	PCB4	12P/T	H9
25.	CN120	–	—	4P/W	H1O

SECTION 9

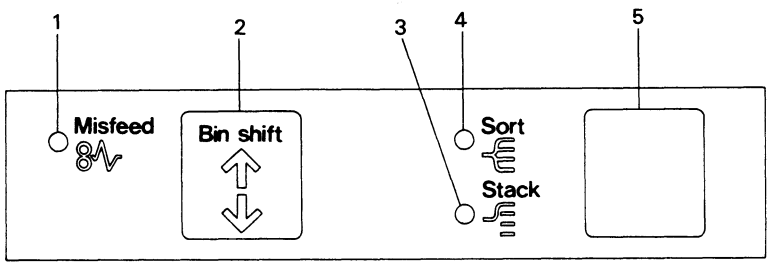
SORTER

1. SPECIFICATIONS

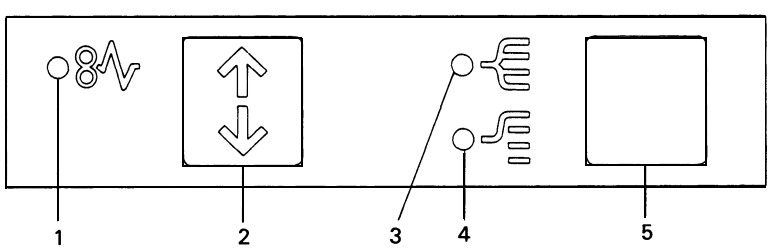
Number of Bins:	**10 bins**	
Paper Size for Bins:	**Maximum** **Minimum**	**A3, 11"x 17"** **A6, 5½"** x 8½" **(Lengthwise)**
Paper Weight:	64 **to** 90 **g/m² (17 to 24 lb)**	
Bin Capacity:	**Sort/Stack Mode**	**20 sheets/ A4,** 8½" **x11"** **15 sheets/ B4,** 8½" **x 14"** **10 sheets/ A3, 11" x 17"**
Top Bin Capacity: (Non-Sort/Stack Mode)	**100 sheets (all sizes)**	
Power Source:	**+ 5 volts and +24 volts from the copier**	
Power Consumption:	**7.7** W	
Dimensions: (WxDxH)	**440 mm x 391 mm x 367 mm** **(1 7.3" x 15.4" x 14.4")**	
Weight:	**7.5 kg (16.5 lb).**	

2. OPERATION PANEL

(115V)



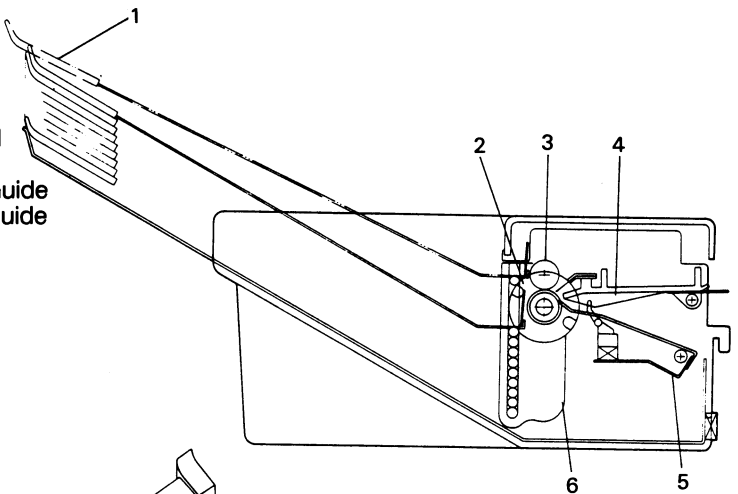
(220/240V)



1. Check Sorter Paper Path Indicator	**Lights when there is a paper misfeed in the sorter.**
2. Bin Shift Key	**Press to shift the bins. Use this key to remove jammed paper.**
3. Stack Indicator	**Lights when copies from different copy runs are to be grouped into individual stacks.**
4. Sort Indicator	**Lights when sets of copies are to be assembled in order.**
5. Sorter Key	**Press to select sort and stack modes or to turn off the sorter (clear mode).**

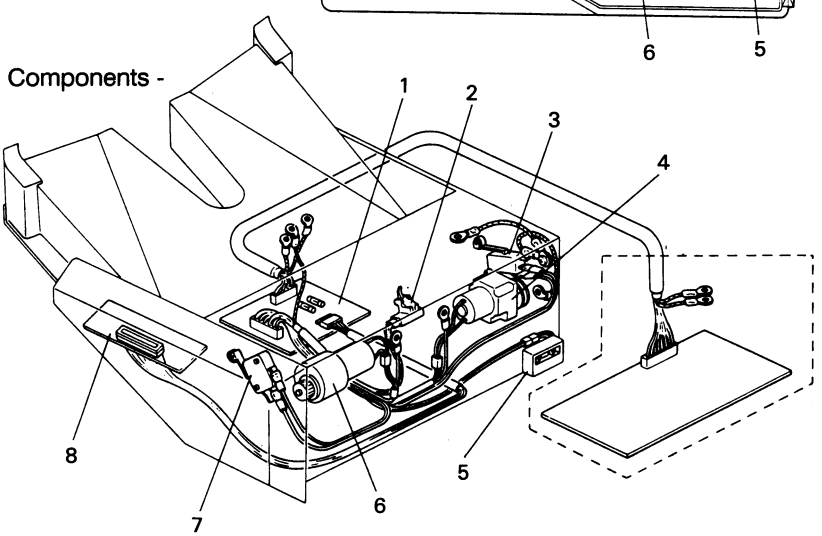
3. COMPONENT LAYOUT

- Mechanical Components -



1. Bin
2. Transfer Wheel
3. Exit Roller
4. Upper Paper Guide
5. Lower Paper Guide
6. Bin Guide

Electrical Components -

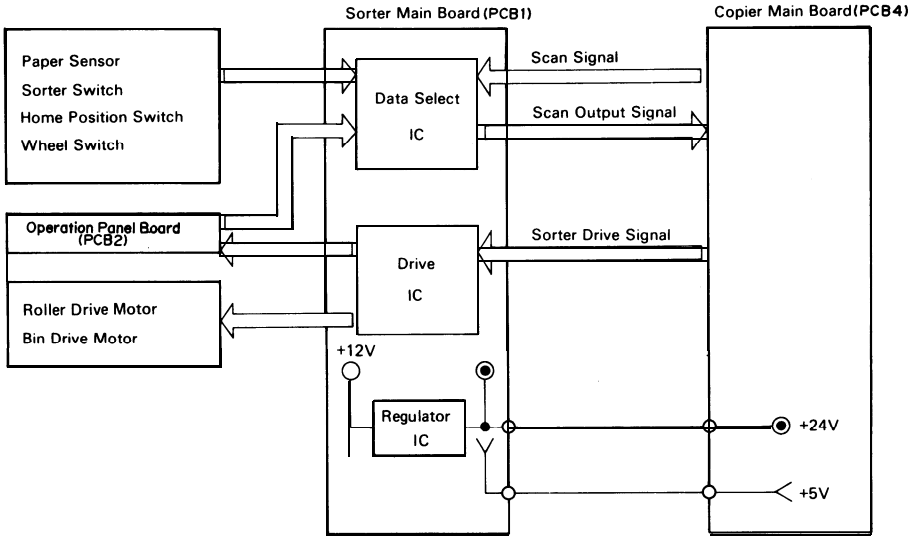


1. Sorter Main Board
2. Paper Sensor
3. Wheel Switch
4. Roller Drive Motor
5. Sorter Switch
6. Bin Drive Motor
7. Home Position Switch
8. Operation Panel Board

4. ELECTRICAL COMPONENT DESCRIPTIONS

Symbol	Name	Function	Location
Motors			
M1	Roller Drive Motor	DC motor that energizes to drive the lower exit rollers.	4
M2	Bin Drive Motor	Reversible DC motor that energizes to move the bins up or down.	6
Switches			
SW1	Wheel Switch	Detects the rotation of the transfer wheel and steps it in the correct position.	3
SW2	Sorter Switch	Read switch that becomes activated when the sorter is in the proper position (aligned next to the copier). Also works as a jam reset switch for the setter.	5
SW3	Home Position Switch	Informs the CPU that all the bins are lowered.	7
Sensors			
S1	Paper Sensor	Serves as the misfeed sensor for the sorter and also sets exit roller and bin drive timing.	2
Printed Circuit Boards			
PCB1	Sorter Main Board	Serves as the communication board between the copier main board and the sorter.	1
PCB2	Operation Panel Board	Contains the Sorter key and Sorter Misfeed indicators.	8

5. OVERALL MACHINE CONTROL



The copier main board provides the sorter main board with +24 volts and +5 volts. +24 volts powers the roller drive motor and the indicator LEDs on the operation panel board, and +5 volts powers all sensors and switches. Also, +24 volts is changed to +12 volts by the regulator IC, which powers the bin drive motor.

The copier main board controls the drive and checks the status of the sorter via the sorter main board. The copier main board sends the scan signal to the data select IC on the sorter main board. After receiving the scan signals, the data select IC outputs the status of the sensor, switches, or keys as the scan output signal.

The copier main board also sends the sorter drive signal. After receiving the drive signals, the drive IC turns on the appropriate motors and operation panel indicators.

6. BASIC OPERATION

- Clear Mode -

When the main switch of the copier is turned on, the sorter automatically assumes the clear mode. In this mode, all copies are stacked on the first bin. The sorter also assumes the clear mode when either the interrupt mode or the manual feed mode is selected.

Sorter operation begins when a copy actuates the copier exit sensor. At this time, the roller drive motor energizes. When the paper exits onto the sorter bin, the paper sensor is de-activated and the roller drive motor is then de-energized. The copier main board monitors the paper sensor through the sorter main board to check for paper misfeeds.

- Sort Mode -

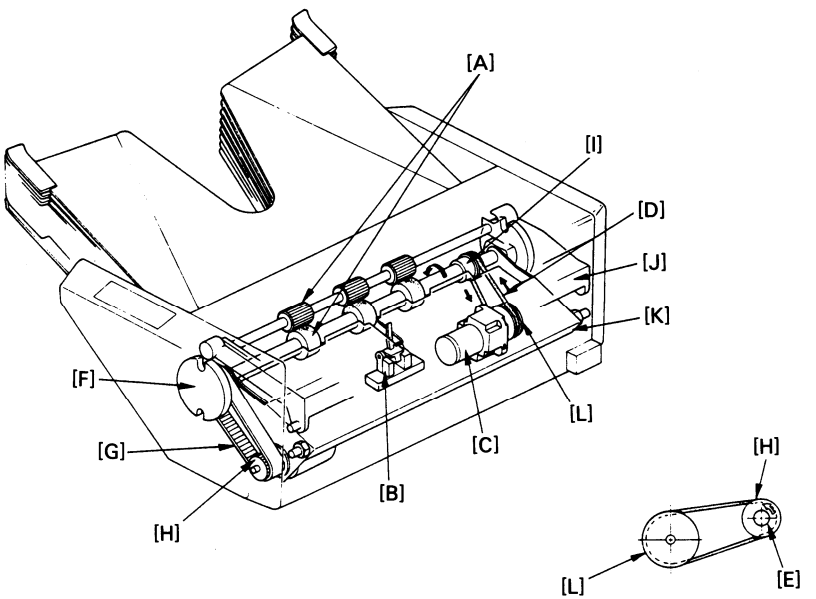
Pressing the Sorter key once shifts the copier to the sort mode. In this mode, all copies of the first original are delivered to separate bins starting from the top. The copies of the second original are delivered to the same bins, but starting from the bottom. The copies of the third original start from the top and so on. The bin drive motor turns on to advance the bin one step, 250 milliseconds after the copy has gone through the paper sensor. If the Copy Quantity, Clear/Stop, Book Copy, or Sorter key is pressed during the sort mode, all bins shift to the home position.

- Stack Mode -

Pressing the Sorter key twice shifts the copier to the stack mode. In this mode, all copies of the first original are delivered to the first bin, all copies of the second original are delivered to the second bin, and so on. The bin drive motor turns on to advance the bin one step, 250 milliseconds after the last copy of the original has gone through the paper sensor. If the Sorter key is pressed during stack mode, all bins shift to home position.

7. EXIT ROLLER DRIVE

7.1 Roller Drive Mechanism

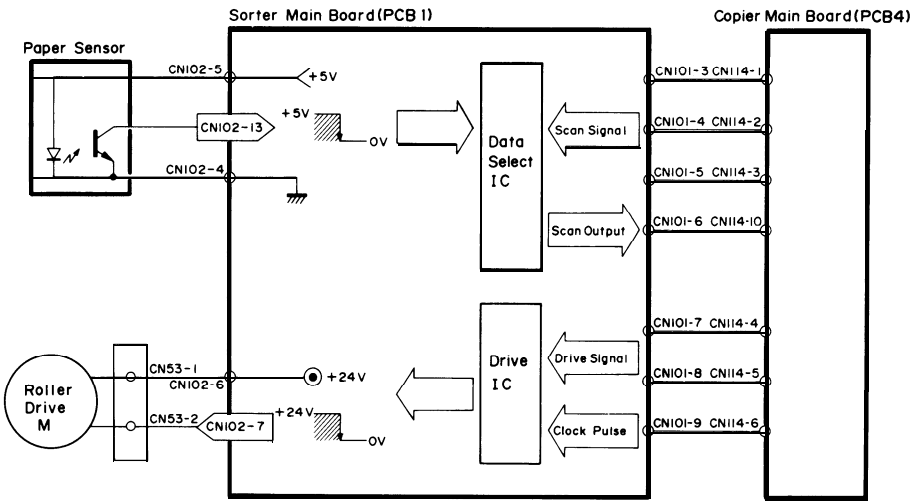


F:	Transfer Wheel
G:	Bin Drive Belt
H:	Bin Drive Pulley
I:	Exit Roller Pulley
J:	Upper Paper Guide
K:	Lower Paper Guide
L:	Roller Drive Motor Pulley

The exit rollers [A] take over paper transport from the copier. When the copy paper actuates the copier exit sensor, the exit rollers start rotating. The exit rollers continue to rotate for 250 milliseconds after the copy paper has gone through the paper sensor [B].

The roller drive motor [C] rotates the lower exit roller via the roller drive belt [D]. The shaft of the lower exit roller is a cylindrical cavity type which rotates around the transfer wheel shaft [E]. The paper sensor is positioned just in front of the exit rollers. The paper sensor detects misfeeds in the sorter.

7.2 Roller Drive Circuit

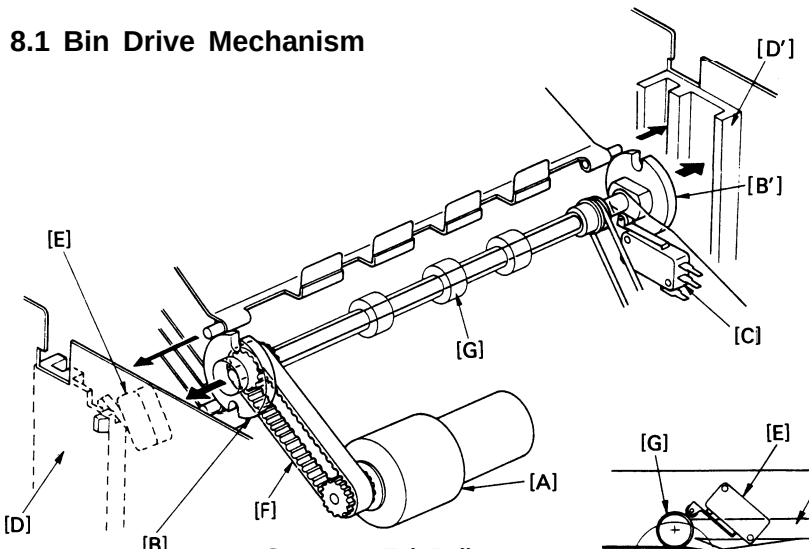


To turn on the roller drive motor, the copier main board sends a drive signal to the drive IC on the sorter main board. After receiving the drive signal, the drive IC drops CN102-7 from +24 to 0 volt to turn on the roller drive motor.

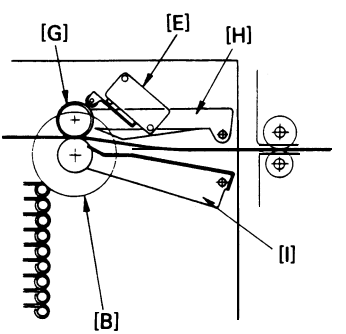
When the paper sensor is actuated, CN102-13 drops to LOW. The main board outputs three scan signals to the data select IC. The status of the sensor changes the resulting scan output signal. Using the scan output signal, the copier main board determines the status of the sensor. For safety reasons, the CPU limits the operation time of the roller drive motor to 5 seconds.

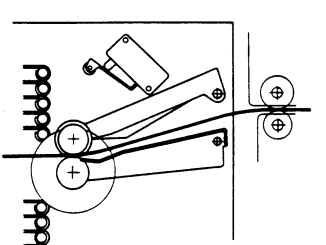
8. BIN DRIVE

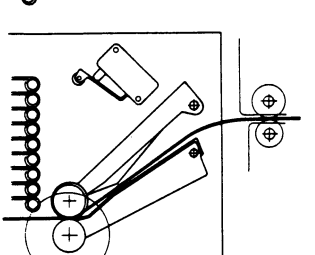
8.1 Bin Drive Mechanism



G: Exit Roller
H: Upper Paper Guide
I: Lower Paper Guide







The bin drive mechanism moves the bins up and down to receive copies under the direction of the copier CPU. The main components in this mechanism are the bin drive motor [A], two transfer wheels [B,B'], the wheel switch [C], and the bins themselves.

Pins on either side of each bin are inserted into slots called bin guides [D,D']. The bins slide up and down in the bin guides. The bins sit on each other with the lower bin resting on the permanently-mounted 10th bin. The upper and lower paper guides pivot up and down depending on the height of the bin to be picked up or released.

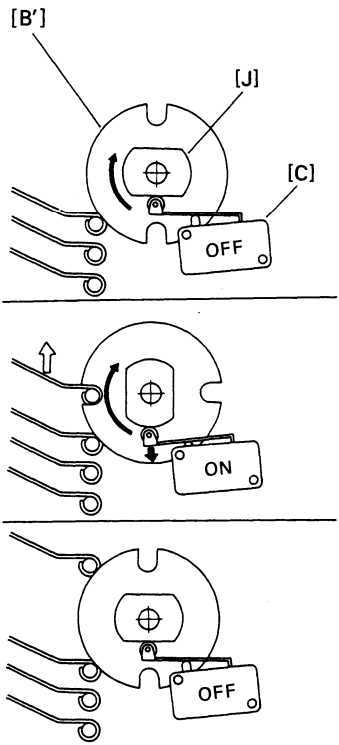
The home position switch [E] informs the CPU when all the bins are lowered.

To move the bins up, the bin drive motor turns clockwise (as viewed from the front). A timing belt [F] turns the transfer wheels.

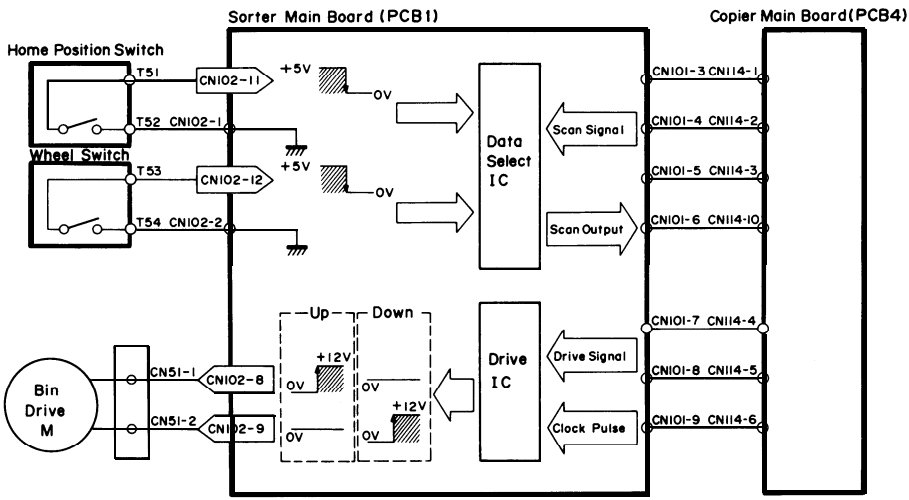
The transfer wheels have two slots in them 180 degrees apart. As the transfer wheels turn, these slots engage the bins and lift them up. Each time the transfer wheels turn 180 degrees, they raise one bin.

To move the bins down, the CPU reverses the bin drive motor and the above processes reverses.

The CPU monitors the position of the bins through pulses generated by the wheel switch and the actuator cam [J]. The actuator cam has two flat sides that are 180 degrees apart and is mounted behind the rear transfer wheel. A pulse is generated each time one of the lobes of the actuator cam passes the wheel switch.



8.2 Bin Drive Circuit

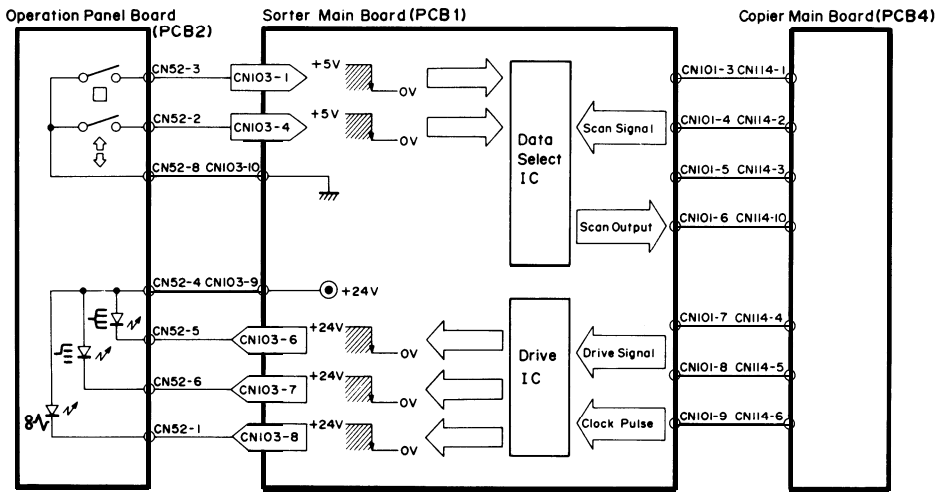


To turn on the bin drive motor, the copier main board sends drive signals to the drive IC on the sorter main board. After receiving the drive signals, the drive IC either raises CN102-8 or CN102-9 to + 12 volts. This turns on the bin drive motor which respectively moves a bin up or down. The main board monitors the output of both sorter switches through the data select IC. When either the home position switch or wheel switch is actuated, CN102-11 or CN102-12 drops to LOW. The main board outputs three scan signals to the data select IC. The status of the switches changes the resulting scan output signal. Using the scan output signal, the copier main board determines the status of the switch.

- Service Call Condition (EA1) -

The CPU monitors the on-time of the bin drive motor to detect a malfunction of the bin drive motor. If the bin drive motor continues to rotate more than twelve seconds, the CPU stops machine operation and displays EA1 on the copier operation panel.

9. OPERATION PANEL CIRCUIT

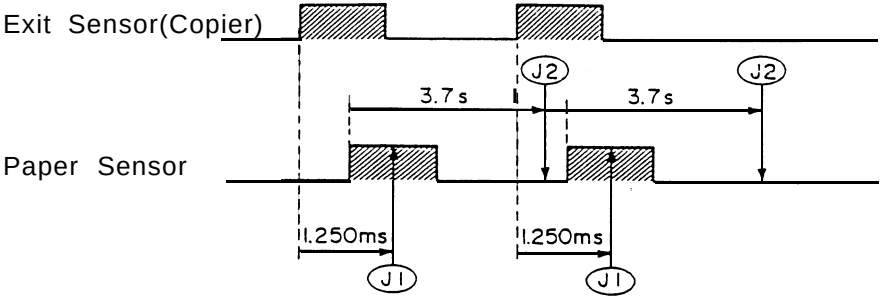


As with the monitoring and the controlling of the switches and the motors, the data select IC and the drive IC are respectively used to detect a pressed key and to turn on the LEDs on the operation panel board.

When the Sorter key or the Bin Shift key is pressed, CN103-1 or CN103-4 drops to LOW respectively, informing the data select IC of the pressed key.

To turn on the Sort indicator LED, the Stack indicator LED, or the Check Sorter Paper Path indicator LED, the drive IC drops either CN103-6, CN103-7, or CN103-8 to LOW respectively.

10. JAM SENSING



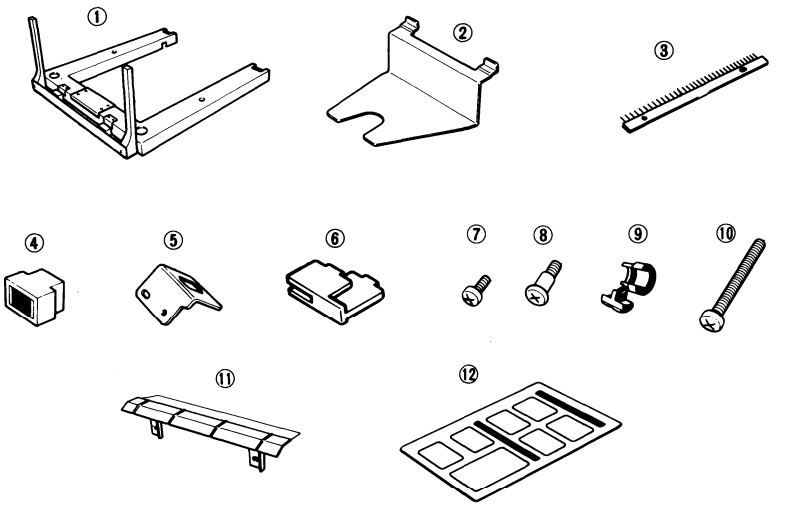
In addition to being used for the exit roller and bin drive timing, the paper sensor checks for a misfeed in the sorter.

When the copier exit sensor is actuated by the copy paper, the CPU on the copier main board starts a timing cycle. After 1,250 mini seconds, the CPU checks whether or not the paper sensor is actuated. (J1: Paper Sensor ON Check)

The CPU also starts a timing cycle when the paper sensor is actuated. Then at 3.7 seconds, the CPU checks whether or not the copy paper has passed the paper sensor. (J2: Paper Sensor OFF Check)

In misfeed condition, the "Check Sorter Paper Path" indicator on the sorter operation panel lights and copier operation is inhibited. To recover the sorter from the misfeed condition, the sorter has to be slid away from the copier, then, after misfed paper removal, returned to its original position.

11 .ACCESSORY CHECK



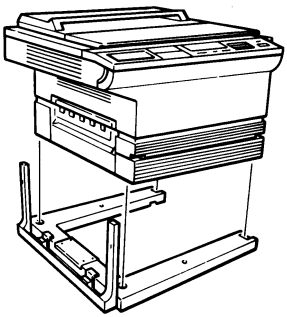
Check the accessories and their quantities according to the following list:

1. Mounting Base ..... 1 pc
2. Proof Tray ..... 1 pc
3. Anti-static Brush ..... 1 pc
4. Magnet ..... 1 pc
5. Harness Bracket ..... 1 pc
6. Mounting Lock ..... 2 pcs
7. Short Screw ..... 3 pcs
   (Incl. 1 Grounding Screw)
8. Stepped Screw ..... 1 pc
9. Bushing ..... 1 pc
10. Long Screw ..... 2 pcs (not used)
11. Lower Guide Plate ..... 1 pc
12. Decal ..... 1 pc
13. Installation Procedure ..... 1 pc
14. N. E.C.R ..... 1 pc
15. Envelope for N. E.C.R. (115V only) ..... Pcl

NOTE: To install the sorter on the FT2050 a sorter compatible main board must be obtained. This is available as an options.

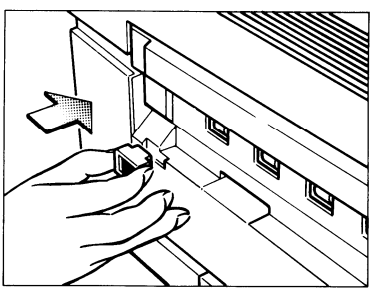
12. INSTALLATION PROCEDURE

1. Install the copier on the mounting base.



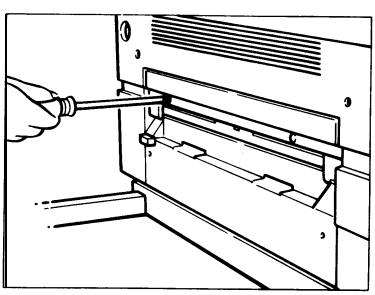
NOTE: Make sure that the legs rest securely in the cut-outs of the mounting base.

2. Install the magnet on the left cover as shown.



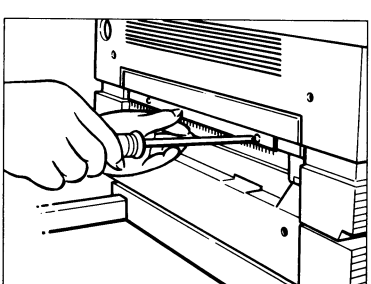
NOTE: Place the magnet in the bottom right-hand corner of the cutout.

3. Remove the two screws on the exit cover.

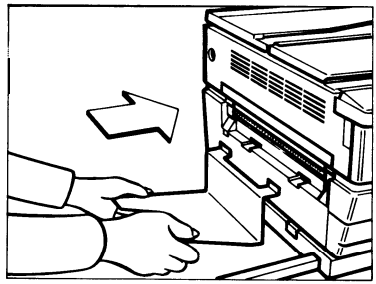


4. Install the anti-static brush.

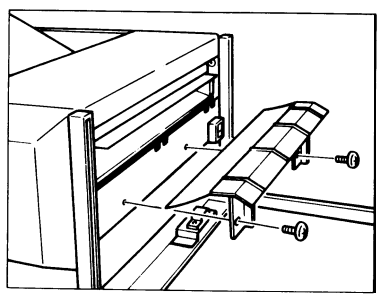
NOTE: Use one of the screws removed in step 3 to secure the left side, and the stepped screw of the accessories to secure the right side.



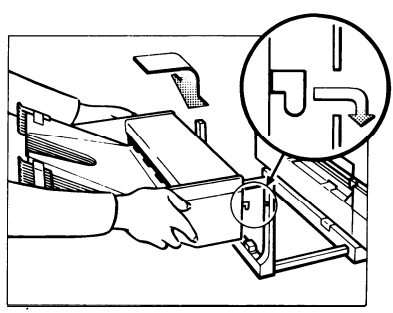
5. Install the proof tray where the copy tray normally fits. (FT2050/2070 only)



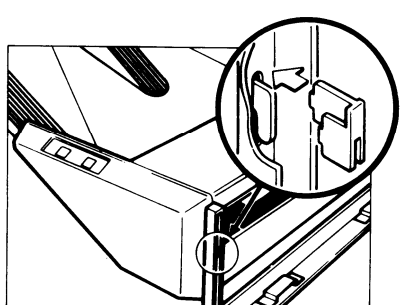
6. **Replace the lower guide plate with the accessory lower guide plate (2 screws). (FT2050/2070 only)**



7. Insert the sorter hooks into the vertical posts of the mounting base, and then remove the strips of tape from the sorter bins.

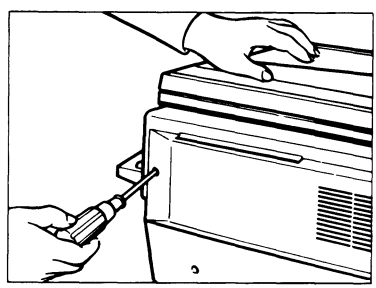


8. Secure the sorter hooks by installing the mounting locks.

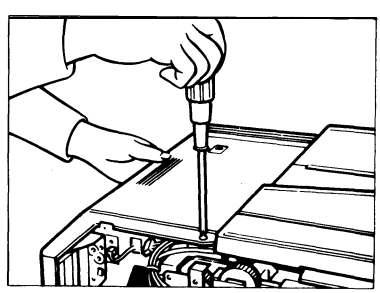


NOTE: Separate installation procedures are needed to install the sorter on the FT2050 and the FT2070/2260. Follow the procedure from step 9 when installing the sorter on the FT2050. Proceed to step 22 when installing the sorter on the FT2070/2260.

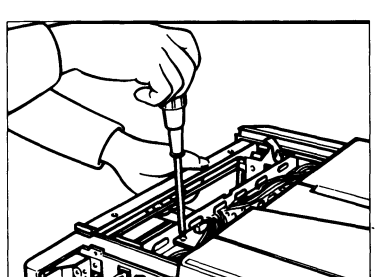
9. **Remove the rear cover (2 screws).**



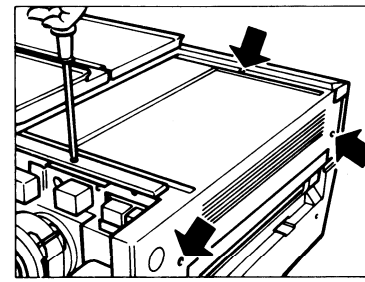
10. **Move the slider to the left by pressing the slider lock release lever. Then, lower the front cover and remove the right cover** (4 **screws).**



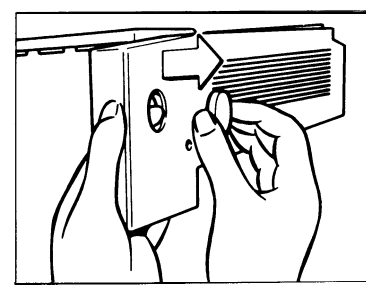
11. **Replace the copier main board with the sorter compatible main board (3 screws and 8 connectors).**



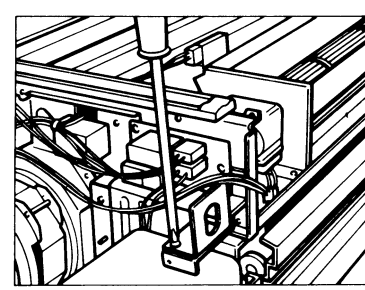
12. **Remove the upper left cover (4 screws).**



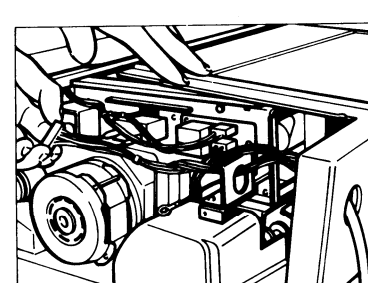
13. **Remove the plastic cap from the docking hole of the upper left cover.**



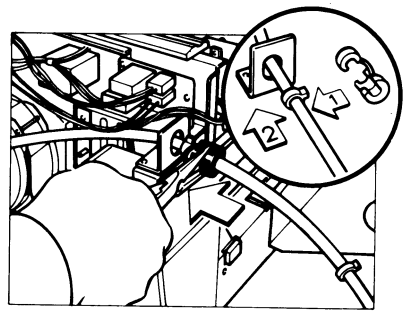
14. Install the harness bracket (2 screws).



15. Thread the sorter harness through the docking hole and the harness bracket.

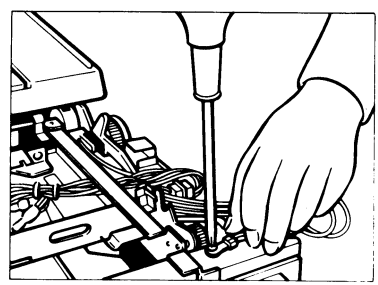


16. **The sorter harness has two harness bands used as markers. Place the bushing on the sorter harness just behind the first harness band from the connector. Secure the bushing in the harness bracket.**

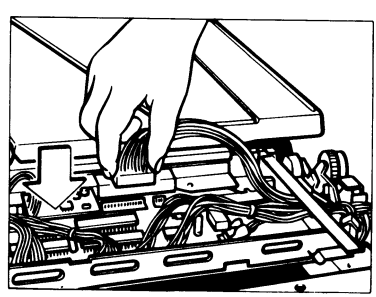


17. **Secure both ground wires to the rear cover bracket (1 screw).**

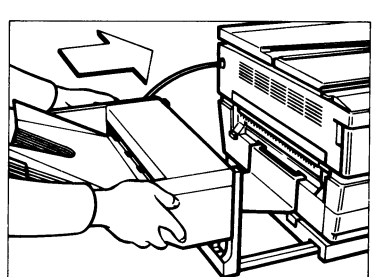
18. **Couple the connector to CN114 on the main board.**



19. **Reassemble the copier.**

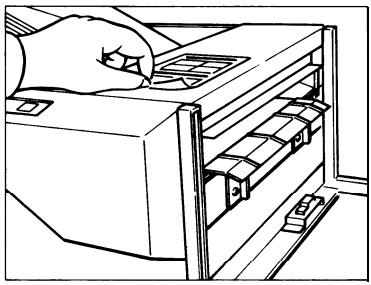


20. **Slide the sorter to its normal position.**

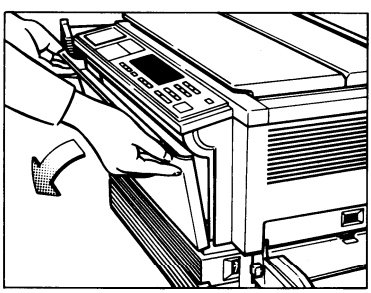


21. Replace the decal on the sorter with the accessory decal, and check the operation in all modes.

    This completes the sorter installation on the FT2050.

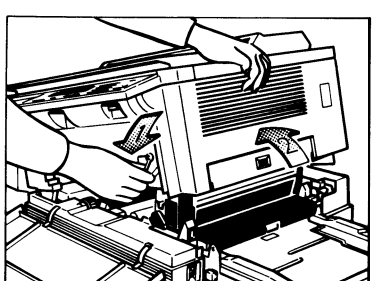


22. Open the front cover.

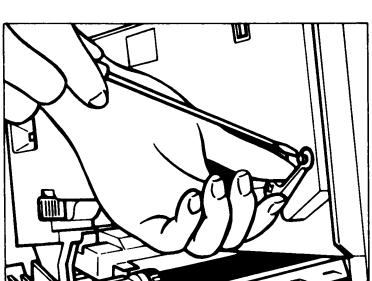


23. (FT2070)
    Move the slider to the center and push down the release lever to open the top unit.

    (FT2260)
    Push down the release lever to open the top unit.

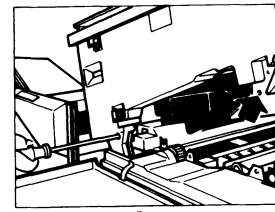


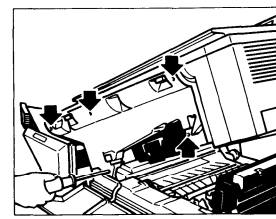
24. Remove the release lever (1 E-ring).



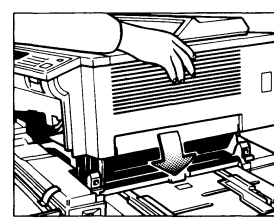
25. (FT2070)
Remove the inner cover (2 screws).

(FT2260)
Remove the inner cover (5 screws).



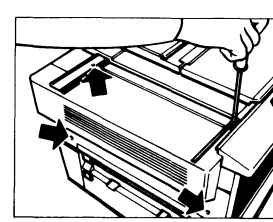


26. Lower the top unit.

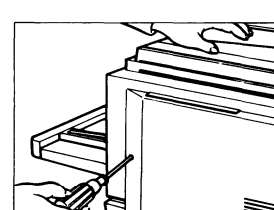


27. (FT2070)
Move the slider fully to the right, then remove the upper left cover (4 screws).

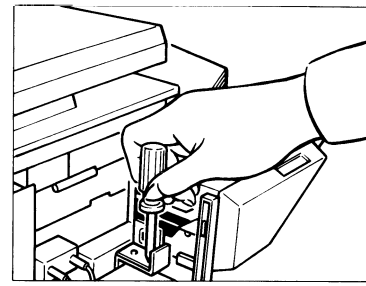
(FT2260)
Remove the upper left cover (4 screws).



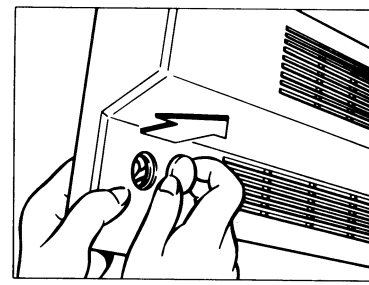
28. Remove the rear cover (2 screws).



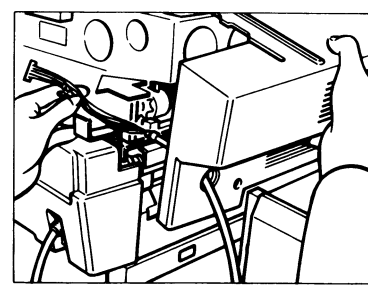
29. **Install the harness bracket on the mounting bracket at the rear of the copier (2 screws).**



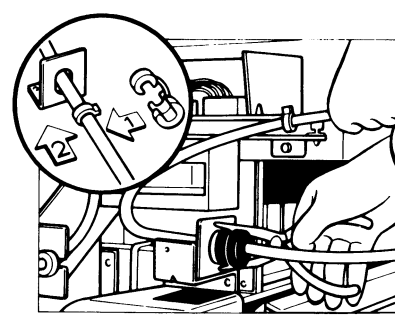
30. **Remove the plastic cap from the docking hole of the upper left cover.**



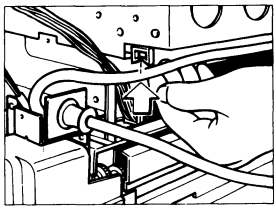
31. **Thread the sorter harness through the docking hole and the harness bracket.**



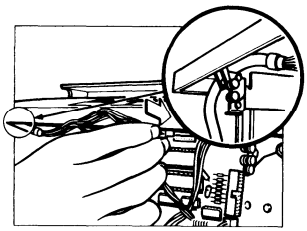
32. **The sorter harness has two harness bands used as markers. Place the bushing on the sorter harness just behind the second harness band from the connector. Secure the bushing in the harness bracket.**



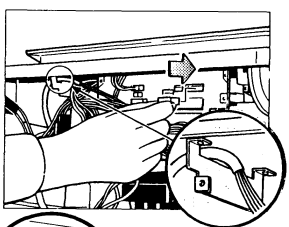
33. Secure the sorter harness into the three wire clamps which are mounted on the left underside of the optics unit.



34. (FT2070)
Run the sorter harness above the total counter bracket, and couple the connector to CN114 on the main board.

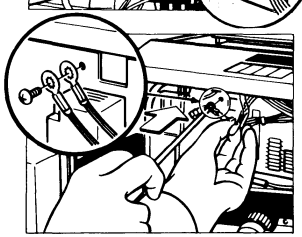


(FT2260)
Run the sorter harness above the operation panel bracket, and couple the connector to CN114 on the main board.

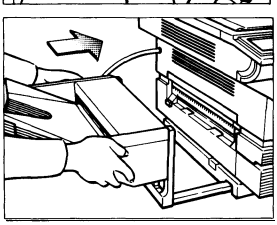


35. Secure the ground wire to the front machine plate (1 screw).

36. Reassemble the copier.



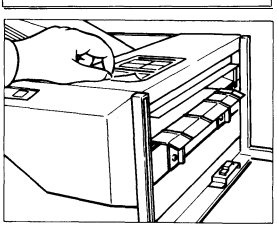
37. Slide the sorter to its normal position.



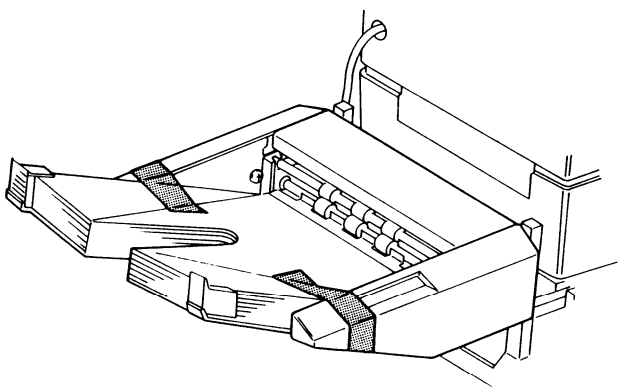
38. (FT2070)
Replace the decal on the sorter with the accessory decal.

39 Check the operation in all modes. Fill out the New Equipment Condition Report.

This completes the sorter installation on the FT2070/2260.



13. PREPARATION FOR TRANSPORTATION

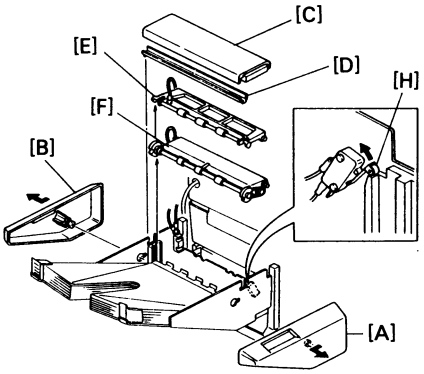


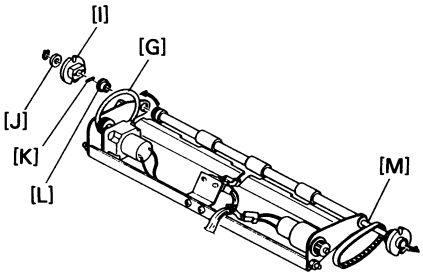
CAUTION: When removing and transporting the sorter, be careful not to carry it in a vertical position as the bins will become dislocated.

CAUTION: Before moving the sorter, be sure to prepare it for transportation as follows. The sorter may be badly damaged if it is moved without proper preparation.

1. If the bins are not at the home position, turn on the main switch of the copier to move the bins to the home position.
2. Secure the bins with strips of tape as shown in the illustration.
3. Remove the sorter from the copier. (See the Installation Procedure [Sorter] section.)

14. ROLLER DRIVE BELT REPLACEMENT





1. **Remove the front cover [A] (1 screw, 1 connector) and rear cover [B] (1 screw).**
2. **Lift off the top cover [C].**
3. **Remove the top stay [D].**

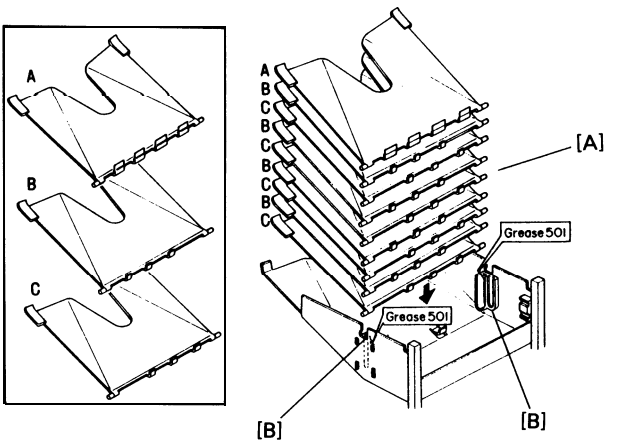
NOTE: Be sure that the short edge of the top stay is facing the exit side of the sorter when reinstalling it.

4. **Lift the upper paper guide [E] up and out of position.**
5. **Lift the lower paper guide [F] out of position and turn it over to remove the roller drive belt [G].**

NOTE: Be careful not to damage the sorter home position switch actuator [H] when reassembling.

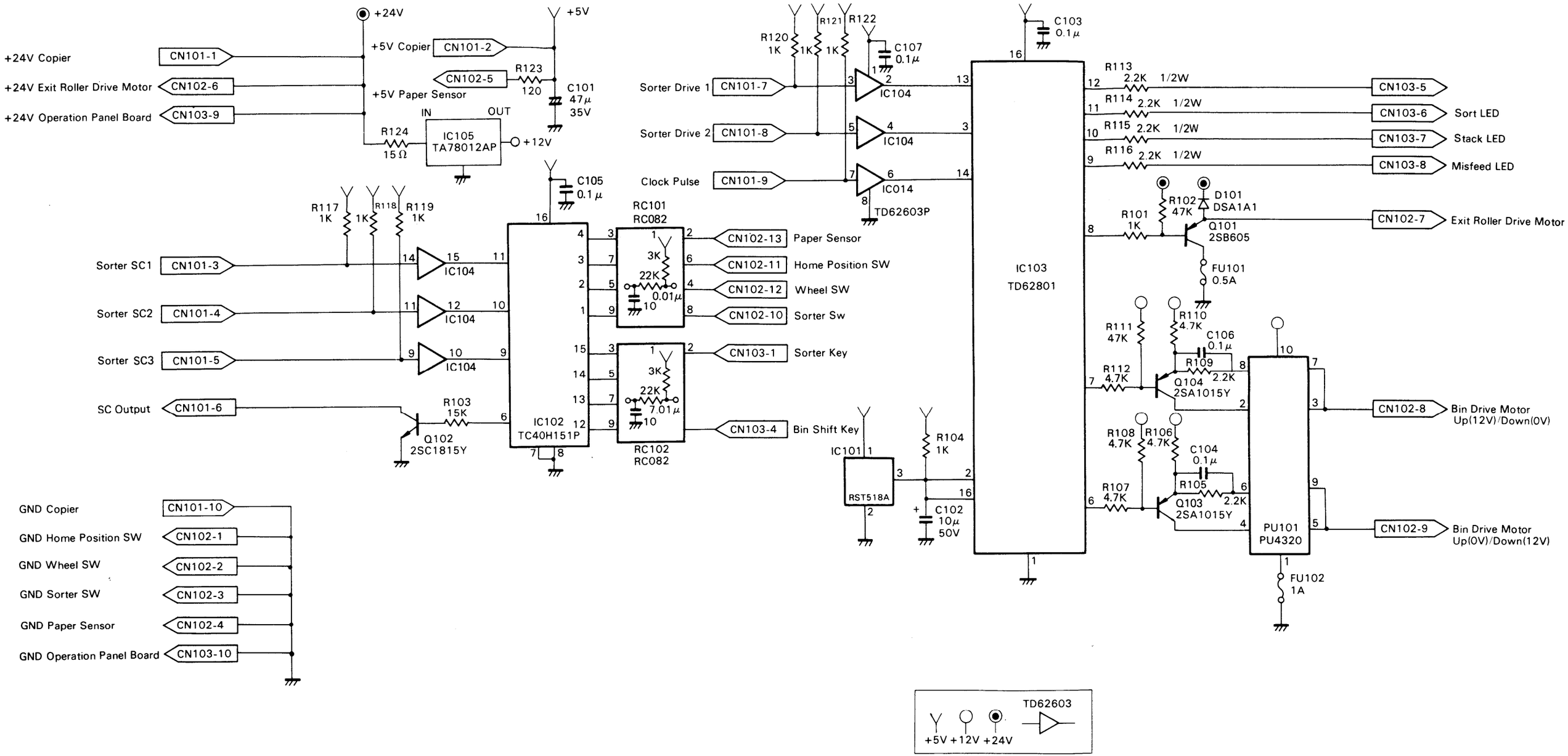
6. **Remove the transfer wheel [I], spacer [J], pin [K] and bushing [L] (1 C-ring).**
7. **Slide the wheel shaft [M] towards the front and remove the roller drive belt.**

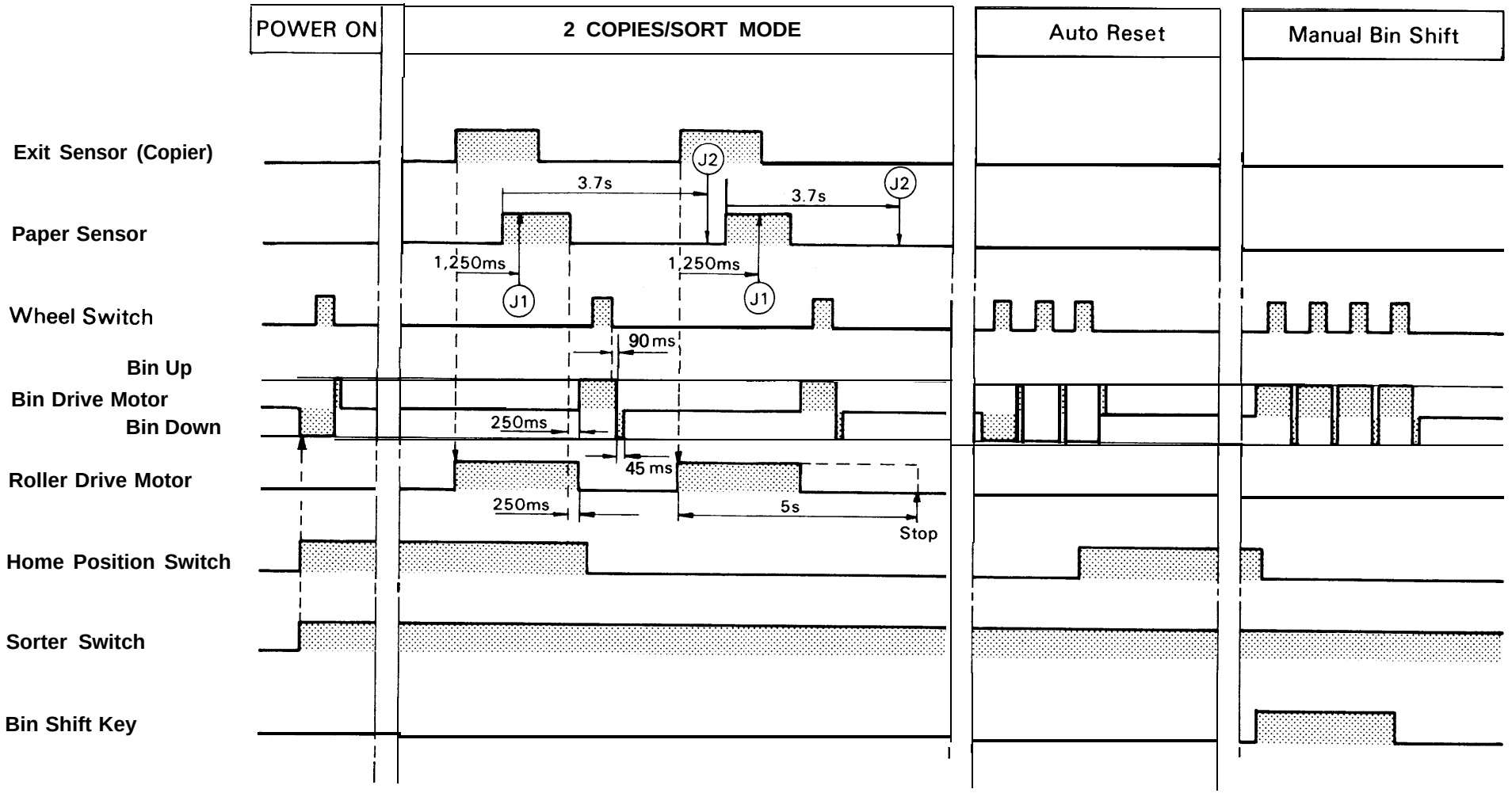
15. BIN GUIDE LUBRICATION



1. **Remove the lower paper guide. (See Roller Drive Belt Replacement section.)**
2. **Remove all bins [A] from the bin guides [B].**
3. **Apply Grease 501 to the grooves of the bin guides.**

NOTE: There are three kinds of bins. Therefore, when installing the bins, be sure that they are installed in the correct order.


+24V
+5V
+24V Copier
CN101-1
+5V Copier
CN101-2
+24V Exit Roller Drive Motor
CN102-6
CN102-5
R123
120
C101
47μ
35V
+5V Paper Sensor
+24V Operation Panel Board
CN103-9
IN
OUT
R124
15Ω
IC105
TA78012AP
+12V
C105
0.1μ
R117
1K
R118
1K
R119
1K
RC101
RC082
Sorter SC1
CN101-3
IC104
Sorter SC2
CN101-4
IC104
Sorter SC3
CN101-5
IC104
SC Output
CN101-6
R103
15K
Q102
2SC1815Y
IC102
TC40H151P
3K
22K
0.01μ
7.01μ
RC102
RC082
CN102-13
Paper Sensor
CN102-11
Home Position SW
CN102-12
Wheel SW
CN102-10
Sorter Sw
CN103-1
Sorter Key
CN103-4
Bin Shift Key
R120
1K
R121
1K
R122
1K
C107
0.1μ
IC104
Sorter Drive 1
CN101-7
Sorter Drive 2
CN101-8
Clock Pulse
CN101-9
IC014
TD62603P
IC101
RST518A
R104
1K
C102
10μ
50V
C103
0.1μ
IC103
TD62801
R113
2.2K
1/2W
R114
2.2K
1/2W
R115
2.2K
1/2W
R116
2.2K
1/2W
CN103-5
CN103-6
Sort LED
CN103-7
Stack LED
CN103-8
Misfeed LED
R102
47K
D101
DSA1A1
R101
1K
Q101
2SB605
CN102-7
Exit Roller Drive Motor
FU101
0.5A
R111
47K
R110
4.7K
C106
0.1μ
R109
2.2K
R112
4.7K
Q104
2SA1015Y
R108
4.7K
R106
4.7K
C104
0.1μ
R105
2.2K
R107
4.7K
Q103
2SA1015Y
PU101
PU4320
CN102-8
Bin Drive Motor
Up(12V)/Down(0V)
CN102-9
Bin Drive Motor
Up(0V)/Down(12V)
FU102
1A
GND Copier
CN101-10
GND Home Position SW
CN102-1
GND Wheel SW
CN102-2
GND Sorter SW
CN102-3
GND Paper Sensor
CN102-4
GND Operation Panel Board
CN103-10
TD62603
+5V +12V +24V

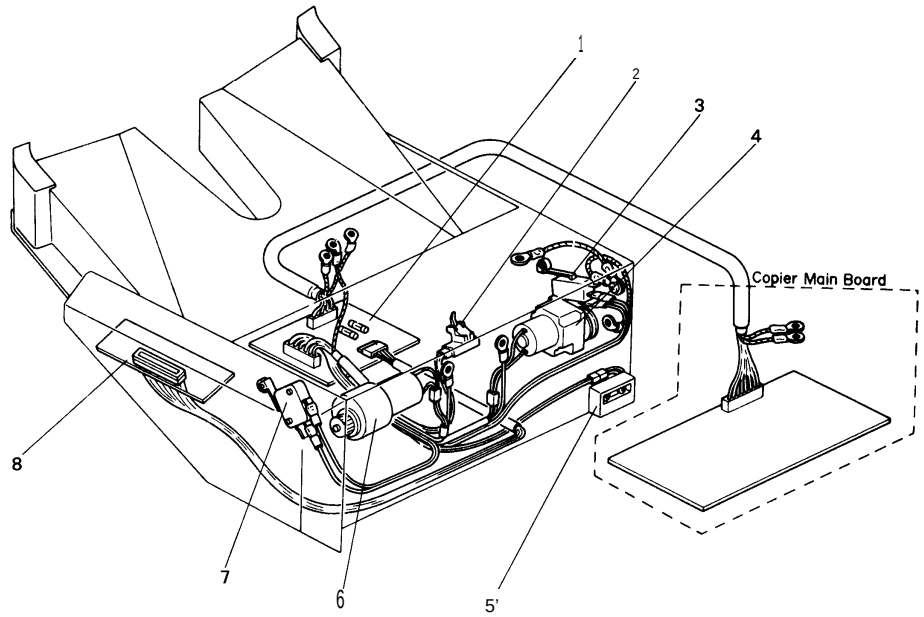


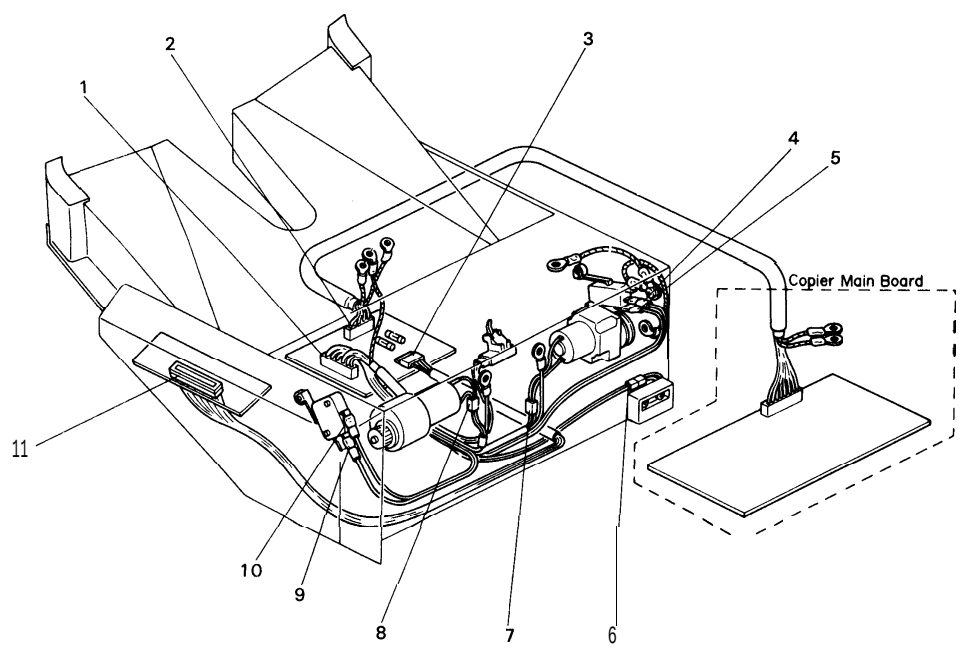
JAM CHECK

J1 : Paper Sensor ON Check

J2 : Paper Sensor OFF Check

ELECTRICAL COMPONENTS AND CONNECTOR LAYOUT-SORTER





Index No.	Description	Symbol	P to P
1.	Sorter Main Board	PCB1	A5-B7
2.	Paper Sensor	S1	A5
3.	Wheel Switch	SW 1	A6
4.	Roller Drive Motor	M I	A5
5.	Sorter Switch	SW2	A6
6.	Bin Drive Motor	M2	A5
7.	Home Position Switch	SW3	A6
8.	Operation Panel Board	PCB2	A6-A7

Index No	CN No.	Description	Symbol	Type	P to P
1.	CN102	Sorter Main Board	PCB1	13P/W	A5-A6
2.	CN101	Sorter Main Board	PCB1	1 OP/W	B5-B6
3.	CN103	Sorter Main Board	PCB1	10P/W	A6-A7
4.	T54	Wheel Switch	SW 1	1 P/R	A6
5.	T53	Wheel Switch	SW 1	1 P/R	A6
6.	CN54	Sorter Switch	SW2	2P/W	A6
7.	CN53	Roller Drive Motor	M I	2P/W	A5
8.	CN51	Bin Drive Motor	M2	2P/W	A5
9.	T51	Home Position Switch	SW3	1 P/R	A6
10.	T52	Home Position Switch	SW3	1 P/R	A6
11.	CN52	Operation Panel Board	PCB2	8P/W	A6-A7